



INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

2395-2636 (Print):2321-3108 (online)

## CONTRIBUTION OF EARLY ARAB SCHOLARS IN PHONETICS IN LIGHT OF MODERN PHONETICS

**Dr. NADHIM ABDULMALEK ALDUBAI**

Associate Professor of Phonetics  
Department of English, Faculty of Education,  
Sana'a University & Department of Languages & Translation  
Taibah University, KSA



**Dr. NADHIM  
ABDULMALEK  
ALDUBAI**

### ABSTRACT

This paper investigates the contribution of early Arab scholars in general phonetics and phonology and its impact on modern phonetics. It is important to note that phonetics and phonology were not independent disciplines. Rather, they were part of other disciplines. Therefore, in terms of early Arab contribution to phonetics and phonology, their scholarship can be derived from three major areas:

(i) Arabic linguistics whose pioneers are Alkhalīl Al-Farāhīdī through his book *Al'ain*, Sibawayh through his book *Al-Kitāb*, and Ibn Jinni through his book *Sir Şina'at Ali'rāb*.

(ii) medicine, philosophy and music whose most prominent figures are Al-Kindi through his book *Istikhrāj Al-mu'mma*, Al-Farābī through his book *Al-Musīqā Al-Kabīr*, and Ibn Sīna through his book *Asbāb Huddūth Al-Harf*.

(iii) the modes of reading and the art of reciting the Qur'an (*Tajwīd*) whose most important contributors are Abu Amr Al-Dānī in his book *Al-Tahdeed fi Al-Itqān wal- Tajwīd*, Makki bin Abi Taleb Al-Qaisi in his book *Al-Ri'āyah litajwīd Al-Qirā'ah wa tahqīq Al-Tilāwah*, and Ibn Al-Jazari in his books *Al-Tamhīd fi 'ilm Al- Tajwīd* and *Al-Mukaddimah Al-Juzariyyah*.

It can be argued that Al-Farāhīdī and Sibawayh are the architects who lay the foundation of Arabic phonetics and phonology. In spite of the lack of equipment and modern tools, both have included in their linguistic works detailed phonetic and phonological treatises on classical Arabic that defined the parameters of these two sub-disciplines for subsequent centuries. This paper highlights the creativity of these early phoneticians in initiating the technical terminology and the analytical tools for the study of Arabic phonetics that are unique to this tradition. However, the paper also points out the areas in which the phonetic analysis of early Arab phoneticians is inadequate, the discrepancies in their discussion, and the areas of agreement with modern discoveries in the field of phonetics and phonology.

**Keywords:** *phonetics, Alkhalīl Al-Farāhīdī, Sibawayh, Ibn Jinni, Ibn Sīna*

©KY PUBLICATIONS

## 1. INTRODUCTION

Interest in phonetics is not confined to the modern times. It is as ancient as the beginning of human languages. The early Arabs have contributed heavily to the advancement of this discipline and produced quality research and made new discoveries. The first Arab linguist who has investigated sounds and the phonemic inventory of the Arabic language is Alkhalīl bin Ahmad Al-Farāhīdī (d. 170/786). Other linguists who have followed the steps of Alkhalīl and contributed to the disciplines of phonetics and phonology are Sibawayh (d. 180/796), Ibn Jinni (d.395/1004), Ibn Duraid, (d.223/933) Al-Mubarrad, (d. 286/899), al-Azhari, (d.370/980), Ibn Manthuwir (d. 630/1311) and Ibn Sīna (d.427/1037).

The extent of contribution made by early Arab phoneticians to the development of phonetic tradition has not been acknowledged by the biographical accounts which record the commencement and growth of linguistics. However, some western scholars have valued the effort of early Arab scholars in phonetics and phonology such as Bergsträsser (1994:13) who states that "*the western phoneticians were not preceded by any nation except for Arabs and Indians*". He also acknowledges that Alkhalīl Al-Farāhīdī is the founder of phonetics. Firth (cited in Al-Najjār (2004)) also states that phonetics has evolved and grown in the service of two holy languages: Sanskrit and Arabic. Indian scholars have also been deeply involved in the study of phonetics. The Indian scholars have been the first who have discussed phonetics as an independent discipline of linguistics. A famous Indian phonetician is Panini whose book is "Ashtadhyayi". Robins (1976:24) claims that Arabs and Indians used more adequate terminology in phonetics and articulation than the terminology used by the Greco-Roman scholars. Robins (1976:98) also claims that the Sibawayh's phonetic description was not up to the Indian standards, his phonetic description was ahead of preceding and contemporary western phonetic science. He also claims that Shadah (1931) argues that "*Sibawayh deserves, due to his endeavor in phonetics, to be considered one of the greatest honor of the Arabs*". The term 'phonetics' (*'ilm al-aswāt*) per se has been used by the Arab scholar Ibn Jinni. However, the

elements of the phonetic analysis have been investigated thoroughly by the Arab linguists, scholars of medicine, music, modes of reading, and *Tajwīd*.

## 2. Areas of Arab endeavors in phonetics

Sciences that have contributed to the emergence of Arabic phonetics can be observed in three domains: (Al-Tayyal,1994:2).

- (i) sciences of the Arabic language (grammar, morphology, syntax, rhetoric, and prosody),
- (ii) sciences of philosophy, medicine and music,
- (iii) sciences of modes of reading and *Tajwīd*,

Due to the fact that only the above first and second areas are relevant to the current research, these two areas will be discussed below:

### 2.1 Areas of Arabic language studies

The study of Arabic as a science starts with the appearance of the first Arabic dictionary *al<sup>ʿ</sup>ain* (The Voiced Pharyngeal Fricative /ʕ/) by Alkhalīl Al-Farāhīdī. The title *al<sup>ʿ</sup>ain* is based on his claim that the place of articulation of the sound /ʕ/ is the first sound which the Arabs produce from the pharynx. The book is considered as the first phonetic analysis in the history of Arabic linguistics. His books on phonetics are *tarākīb al-aswāt* (Structure of Sounds), *kitāb al-nagham*, (The Book of Melodies), and *kitāb Al-īqā'a* ( The Book of Rhythm) (Al-Hamawi, Y,11:74; Ibn Khillikān, 2:246).

The second inspiring figure in this area is the student of Alkhalīl Al-Farāhīdī, Sibawayh, whose magnum opus is *Al-Kitāb* (The Book) which includes a thorough analysis of Arabic phonetic and phonological fundamental problems that vary from the description of the places and manners of articulation to the study of the suprasegmental features such as assimilation, dialectology and modes of reading. It also presents a deep analysis of the Arabic phonemes and the allophonic variations of some sounds. He also discusses the allophones of the glottal stop and the phonetic variations such as the full articulation of the glottal stop /ʔ/, the leaning pronunciation (*al-imālah*), the vowelization (*al-l'āl*) and replacement (*al-ibdāl*) of the glottal stop. The book has been considered as a major reference to all phoneticians, grammarians, and dialectologists for subsequent centuries.

Other important scholars in the area of Arabic language studies are Al-mubarrad whose book is *Al-Muqtabadhab*, Ibn Al-Sirāj (d.316/928) whose books are *Al-Ussul fi Alnahw*, and *Risālat al-Ishtiqāq*, Ibn Duraid whose book is *Al-Jamharah*, Alzajāji (d.340/951) whose book is *Al-Jumal*, and *Al-Azhari* whose book is *Al-Taḥṭhib*. Scholars who explain the book of Sibawayh and elaborate on his phonetic ideas are like Al-Sirāfi (d.368/978), whose book is *Sharh Kitāb Sibawayh*, Al-Rummani (d.384/994) whose book is *Sharh Kitāb Sibawayh*, Al-'Iam Al-Shantamari (d.476/1083), whose book is *Sharh Shawāhid Sibawayh*, Abu Ali Alfārsi (d.377/987) whose book is *Ta'liqah ala Kitāb Sibawayh*. Another important scholar is *Al-Zamakhshari* (d.538/1143) whose book *Al-Mufasssal* has been elaborated on by Ibn Ya'ish (d.643/1245) meticulously especially with reference to the science of phonetics. Another great scholar is Al-Ridha Al-Isterbāthi (d.686/1287) whose book is *Al-Shāfiya* which is a detailed morphophonemic analysis of Arabic. Other books on phonetics that are not available today but have only been mentioned in old Arabic references are like *Al-Aswāt* by Qutrub (Sibawayh's student) (d.206/821), *Al-Aswāt* by Al-Akhfash (d.215/830), *Al-Aswāt* by Ya'qūb bin Alsukeit (d.246/860), *Al-Aswāt* by Ibn Abi Dunia (d.281/894), *Al-Swāt wal-Bahha* by Yehya Bin Masweih (d.243/857), and *Al-sawt* by Galenus which is translated into Arabic by HunaynibnIshaq (d.298/910).

The second famous phonetician after Sibaway is Ibn Jinni who is the first linguist to author a book on phonetics as an independent discipline. In his book *Sir Sinā'at Ali'rāb*, Ibn Jinni gives a detailed description of the places of articulation, manners of articulation, and the suprasegmental features such as *i'lāl* (vowelization), *ibdāl* (replacement), *idghām* (assimilation), *'alnaql'* (transfer), *'alḥathf'* (deletion). He also discusses the differences between the letter and the vowel, suitable and odd sounds, gemination and degemination and other phonological issues. He is considered to be truly a pioneer in the field of phonetics and phonology. His phonetic writings were not only confined to his book *'Sir Snā'at Ali'rāb'*. However, you can also find phonetic analysis in his other book *'Al-Khasāis'* in which he tackles phonological problems such as the 'quality of

vowels', 'vowel lengthening' and 'consonant lengthening' (Bohas et al (1990)). Omer (2003:100) claims that Ibn Jinni is the first linguist who uses the term *'ilm Al-Aswāt'* (phonetics). As a result of his deep interest in phonetics, Ibn Jinni writes another book on the 'length of vowels and sounds' (*Risālah fi Madd al-Aswāt wa Maqādīr Almaddāt*). Ibn Jinni's ideas and books have attracted the attention and interest of different western and Arabic scholars and phoneticians such as Henry Flesh in his paper *"Al-Tafkīr Al-Sawti 'ind Al-Arab fi Dhaw 'Sir Sinā'at Ali'rāb libni Jinni"*, Hussam Al-Nu'emi in his book *"Al-dirāsāt Allahgiyyah wa Al-sawtiyyah 'ind Ibn Jinni'*, and Mohammad Hassan Bakla in his book *'Ibn Jinni 'Alim Al-Sawtiyyāt'*.

Phonological problems are also discussed in several books on Arabic linguistics, such as *'kitāb Al-Jīm'* on dialectology by Abi 'Amr Al-Shaibāni (d. 206), *Al-Bayān wal- Tabyīn* by Al-Jāhiḡ (d.255/868) in which he discusses *Al-Lathghah* (lispings) as a speech defect, sound structure, and repetition of sounds. *Abu Hātim Al-Rāzi* (d.322/933) in his book *Al-Zīnah*, carries out a contrastive linguistic analysis of Arabic and Persian sounds. Abu Bakr Al-Bāqillani (d.403/1012) in his book *'I'jāz Al-Quran'* discusses the manners of articulation and their relationship to Quranic verse-opening words. Al-Khafaji (d.466/1073) writes *Sir Al-Fasāha* (Secret of the Eloquence) in which he discusses the essence of sounds, places and manners of articulation and gemination and degemination of sounds. Al-fakhr Al-Rāzi (d.606/1206) in his exegesis (*Al-Tafsīr Al-Kabīr*) discusses sounds, their initiation, and their relation to anatomy. In his other book *Al-Mabāhith Al-Mashriqiyyah fi 'Ilm Al-Ilāhiyyat Al-Tabi'yāt* demonstrates the speech mechanism in such a way that is almost similar to modern physiology (Al-Tayyal,1994:7). The noticeable problem in the Arabic history of phonetics and phonology is that subsequent linguists do not improve the findings of early linguists such as Al-Farahīdi, Sibawayh, Ibn Jinni and Ibn Sīna. The subsequent linguists, for centuries, only recycle what the early Arab scholars have written. However, the subsequent linguist Al-Sakāki through his *Miftāh Al-Olūm* has successfully drawn a preliminary sketch of the vocal organs which

can be claimed to be compatible with today's account (Heselwood and Hassan, 2011).

### 2.2 Areas of philosophy, medicine and music

The first pioneering figure in this field is the philosopher Al-Kindi (d.260/873) who studies sounds very closely and wrote many books such as *Istikhrāj Al-mu'mma* (cryptography) in which he presents the repetition and re-arrangement of sounds based on a phonological rule devised by Al-Kindi. According to this phonological rule, he classifies sounds into consonants and vowels (*sāit and sāmit*). Based on his own statistics, Al-Kindi makes a universal conclusion that consonants are more frequent than vowels in all languages. Then, he divides vowels into long and short. Moreover, he establishes more than one hundred phonological rules of euphony and cacophony. Al-Kindi has also written another book of applied phonetics (*Allathghah* (lispings)) in which he tackles speech defects. In the introduction of the book, he gives a detailed description of the speech mechanisms of various languages. Then he discusses the reasons of lispings and the description of places of articulation with an anatomical analysis. Al-Kindi is the first Arabic physician who discusses acoustic phonetics, dynamics of air, air stream mechanism, and auditory perception of linguistic and non-linguistic sounds (Al-Hleis, 1985:101).

The second important scholar is Al-Farābi (d.339/950). In his book *Al-Musīqa Al-Kabīr*, he discusses sound and consonance, lax and hard sounds. He also refers to the possibility of using some machines to measure the sound. Ikhwan Al-Safa (4<sup>th</sup>/10<sup>th</sup> century) have composed a book on music *Al-Musīqa* in which they discuss the auditory power of sounds.

Another prominent scholar is Ibn Sīna (d. 428/1036). In his highly valued book *Asbāb Huddūth Al-Harf* he unprecedentedly discusses a variety of phonetic problems from different perspectives. These problems include:

- (i) articulatory phonetics,
- (ii) physics of speech,
- (iii) anatomy of vocal organs,
- (iv) contrastive phonetics where he contrasts Arabic sounds to other sounds of different languages, and

- (v) onomatopoeia.

### 2.3. Area of modes of reading and Tajwīd

The scholars of this area connect the study of phonetics to the study of the Quran and Quranic recitation. Bergsträsser (1994:13) points out that "*the science of phonetics was part of the science of grammar and the readers of the Quran use it for the sake of improvement the recitation of the Quran*". Tajwīd is the practical phonetics of Quranic discourse. The problems that are discussed in Tajwīd are:

- (i) assimilation of *nun* /n/ and nunation (*tanwīn*),
- (ii) gemination,
- (iii) the states of the glottal stop,
- (iv) phonemes and allophones, and
- (v) places and manners of articulation

The first poem composed in this area of study is *Al-Qasīdah Al-Khaqāniyyah in Tajwīd* by Musa bin Khaqān (d.325/936). The poem is explained by Imam Al-Dāni (d. 444/1052) who also authors a book on tajwīd (*Al-Tahdīd fi Al-Itqān wal-Tajwīd (Tajwīd Al-Tilāwah)*) (p:98). The most important book on Tajwīd is *Al-Ri'āyah litajwīd Al-Qirā'ah wa tahqīq Al-Tilāwah* by Makki bin Abi Taleb Al-Qaisi (d. 437/1045). In this book, he discusses the following themes (Al-Qaisi 1996):

- (i) a detailed account of forty four manners of articulation of Arabic sounds,
- (ii) the state and the different allophonic variations of the glottal stop,
- (iii) different allophonic pronunciations of Quranic phonemes,
- (iv) the states of nasal sounds,
- (v) the differences in places of articulation, and
- (vi) gemination and degemination.

All the scholars who come after Makki bin Abi Taleb Al-Qaisi have only followed his steps. In other words, they have not effectively contributed to this field with the exception of the prominent scholar Ibn Al-Jazari (d. 833/1429) who has authored several books and composed many poems in the field of modes of reading and tajwīd, such as *Al-Tamhīd fi 'ilm Al-Tajwīd* and *Al-Mukaddimah Al-Juzariyyah*.

### 3. Contribution of early pioneers of Arabic phonetics

In this section, we will discuss the scholarship of major early Arab phoneticians. With regards to the first area (Arabic linguistic studies), Al-Farāhīdi and Sibawayh will be discussed. As for the second area (philosophy, medicine and music), Ibn Sīnawill be discussed. The third area (modes of reading and tajwīd) falls outside the scope of the present discussion.

#### 3.1 Alkhalīl bin Ahmad Al-Farāhīdi

Al-Makhzumi (1986) claims that Al-Farāhīdi is the first Arab linguist who has discovered the relationship between the study of phonetics and the study of morphological and syntactic analysis. Al-Farāhīdi has also paid attention to the study of phonetics. His research in the rearrangement of the order of sound description based on their places of articulation and adroitly has paved the ground for the subsequent phoneticians and enabled them to describe the manner of articulation and the segmental and suprasegmental features of Arabic. Let us consider how Al-Farāhīdi arranges the description of the Arabic sounds according to his book *Alfain*:

##### 3.1.1 Al-Farāhīdi's order of consonants

In his introduction to *Alfain*, Al-Farāhīdi introduces a phonetically-based alphabet different from the traditional letter-based alphabet and argues that he "cannot start with description of the alif /a/ as it is a vowel and not a consonant" (1999, 1:47). Since it is impossible to start with the letter-based alphabet alif /a/, he does not like to start with the *ba* /b/ without any phonological evidence. When he closely looks into the sounds based on their places of articulation and based on the air stream mechanism, Al-Farāhīdi prefers to start with the voiced pharyngeal fricative /ʕ/ because, in his view, it is the first sound which humans produce from the pharyngeal cavity. The experiment that he has conducted has been to utter a sound preceded by a vowel [ab], [ak] [ax] etc. Based on this experiment, he orders the sounds beginning from the pharyngeal /ʕ/, velar, palatal, alveolar to the bilabial nasal /m/. As a result, the word *alfain* has been given as a title to his book. Despite the fact the pharyngeal /ʕ/ is not the first sound to produce from the pharyngeal

cavity because it is preceded by the glottal sounds /ʔ/ and /h/ in terms of modern phonetics, Al-Farāhīdi has preferred to use the /ʕ/ as a title for his book and the first sound to describe phonetically. His position is based on the fact that the glottal stop /ʔ/ and the glottal fricative /h/ are phonetically problematic. We can, therefore, claim that the description of sounds based on their horizontal dimension is attributed to Al-Farāhīdi. However, Ibn Kayysān (d. 299/911) argues that Al-Farāhīdi has been aware of the fact that the /ʕ/ is preceded by the glottal stop /ʔ/ and the glottal fricative /h/. As quoted by Al-Suyūti (1999, 1:90), Ibn Kayysān has claimed that Al-Khalīl says: "I neither start my book with the description of the glottal stop /ʔ/ because it is subject to change, deletion and shortening, nor with the alif /a/ because it cannot be on the onset of a word, nor with the glottal fricative /h/ because it is a hidden voiceless sound. Thus, I have come down to the second cavity in which I have found the pharyngeals /ħ/ and /ʕ/. I have also found that the /ʕ/ is phonetically clearer in pronunciation than the /ħ/. For this reason, I have started my phonetic description with /ʕ/".

According to Al-Farāhīdi, the order of the consonants based on their points of articulation is as follows:

/ʕ/, /ħ/, /h/, /x/, /ʁ/, /q/, /k/, /dʒ/, /ʃ/, /d/, /s/, /z/, /t/, /d/, /t/, /ð/, /θ/, /ð/. /r/, /l/, /n/, /f/, /b/, /m/, /w/, /a/, /j/.

##### 3.1.1.1 Comparison between Al-Farāhīdi's order and the IPA chart

Let us consider the following Table 1 which compares the order of Al-Farāhīdi to the order of the modern IPA chart.

Based on Table 1 above, we can make the following observations:

- (i) the number of the sounds in both lists is the same; however, there is a mixture between consonants and vowels in Al-Farāhīdi's order as we can observe in number (27) where he adds the alif /a/. However, we believe that he considers the alif and the hamza /ʔ/ as two allophones of the same phoneme due to the confusion in writing.

Table 1. Order of consonants according to Al-Farahīdi and to the IPA chart.

	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2
										0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8
Alfar āhīdi's order	ʕ	ħ	h	χ	ʁ	q	k	ɟʒ	ʃ	ɗ	s <sup>ʕ</sup>	s	z	t	d	t	ð	θ	ð	r	l	n	f	b	m	w	a	j
IPA chart order	ʔ	h	ʕ	ħ	ʁ	χ	q	k	j	ʃ	ɟʒ	s	s <sup>ʕ</sup>	z	t	t <sup>ʕ</sup>	d	ð	θ	r	n	ð <sup>ʕ</sup>	ð	θ	f	b	m	w

- (ii) the glottal fricative /h/ comes after the /ʕ/ and /ħ/ in Al-Farāhīdi's order while it is before /ʕ/ and /ħ/ in the IPA order.
- (iii) from number (4) to number (16), the order of Al-Farāhīdi is similar to the order of the IPA chart where the horizontal dimension runs from the uvulars /χ, ʁ, q/ to the velar /k/, then to the postalveolars /ʃ, ɟʒ/, and finally to the alveolars /ɗ, s<sup>ʕ</sup>, s, z, t<sup>ʕ</sup>, d, t/.
- (iv) the labiodentals /ð<sup>ʕ</sup>, θ, ð/ come before the alveolars /r, l, n/ in Al-Farāhīdi's order whereas they come after the alveolars in the IPA chart.
- (v) the bilabials /b, m w/ are similar to the IPA chart order.

(vi) the palatal semivowel /j/ comes at the end of the list in Al-Farāhīdi's order because he considers it as a vowel; however, this semivowel is palatal approximant in the IPA chart.

3.1.1.2 Al-Farāhīdi's grouping of consonants compared to the IPA's order

Al-Farāhīdi does not only order the consonants based on their places of articulation, but he also groups them in categories based on their places of articulation and gives each category a descriptive title. Table 2 shows Al-Farāhīdi's grouping of sounds based on their places of articulation:

Table 2 Al-Farahīd's grouping of sounds based on their places of articulation:

	sounds	P.O.A	translation	IPA
1	ʕ ħ ʁ χ	halqiyya	pharyngeals	pharyngeal & uvular
2	q k	lahawiyya	uvulars	uvular & velar
3	ɟʒ ʃ ɗ	shajriyah	palatal	postalveolar & alveolar
4	s <sup>ʕ</sup> s z	asaliyyah	apical	apico-alveolar
5	t <sup>ʕ</sup> t d	nat'iyyah	alveolar	apico-alveolar
6	r l n	thalaqiyyah	laminal	lamino-alveolar
7	ð <sup>ʕ</sup> θ ð	lathawiyyah	gum ridge	dental
8	f b m	shafawiyyah	bilabial	bilabial
9	j w a ʔ	hawaiyyah	oral	palatal, bilabial, open vowel, glottal stop

Based on table 2, we can make the following observations:

- (i) Al-Farāhīdi considers /ʕ/, /ħ/, /ʁ/, and /χ/ as pharyngeals (*halqiyyah*) whereas in the IPA chart classification, the /ʕ/ and /ħ/ are pharyngeals but /ʁ/ and /χ/ are uvulars.
- (ii) Al-Farāhīdi puts /q/ and /k/ in one category as uvulars (*lahawiyyah*); however, the /q/ is uvular while /k/ is velar according to the classification of the IPA chart.

(iii) /ɟʒ/, /ʃ/ and /ɗ/ are classified as palatals (*shajriyah*) by Al-Farāhīdi; according to the IPA chart, the /ɟʒ/, /ʃ/ are postalveolar or prepalatal while the /ɗ/ is described as voiced pharyngealized alveolar where the pharynx is involved in the production of /ɗ/ as a secondary articulation.

(iv) The /s<sup>ʕ</sup>/, /s/ and /z/ are named by Al-Farāhīdi after the active articulator, i.e., the apex of the tongue. In the IPA chart, places

- of articulation are given based on the passive articulators. Consequently, /s<sup>ʕ</sup>/, /s/ and /z/ are apico-alveolar in the IPA chart.
- (v) The /t<sup>ʕ</sup>/, /t/ and /d/ are described by Al-Farāhīdi as alveolars (*nat'iyyah*) which is similar to the description of the IPA chart. However, the IPA chart describes the /t<sup>ʕ</sup>/ as voiceless pharyngealized alveolar where the pharynx is involved in the production of /t<sup>ʕ</sup>/ as a secondary articulation.
- (vi) The /r/, /l/ and /n/ are described by Al-Farāhīdi as *dhalaqiyyah* (laminal). This description is based on the active articulator. In modern phonetics, the /r/ and the /l/ are described as lamino-alveolar or laminal coronals where the description is primarily based on the passive articulator.
- (vii) The /ð<sup>ʕ</sup>/, /θ/ and /ð/ are described by Al-Farāhīdi as *lathawiyyah* (gum). This definition is not in line with the description of the IPA chart. In modern phonetics, the /θ/ and the /ð/ are described as dental; the /ð<sup>ʕ</sup>/ is described as a pharyngealized dental because the pharynx is involved in the production of the /ð<sup>ʕ</sup>/ as a secondary articulation.
- (viii) The /f/, /b/, and /m/ are described by Al-Farāhīdi as bilabial (*shafawiyyah*). This description corresponds to the modern description by the IPA chart. The difference between /f, b/ and /m/ is that the /m/ is

nasal whereas the /f/ and the /b/ are oral sounds.

- (ix) The /j/, /w/, /a/, and /ʔ/ are described by Al-Farāhīdi as *hawā'iyyah* (pneumatic). In the IPA chart, the description is totally different. The /j/ is dorso-palatal, the /w/ is labio-velar, the /a/ is an open vowel, and the /ʔ/ is a glottal stop.

### 3.2 Sibawayh

Through his book *Al-kitāb*, the most celebrated book ever written on Arabic and linguistics, Sibawayh has had the greatest impact on the study of Arabic and Arabic linguistics until our present time (Al-Ani, 1995). The name Sibawayh has been proverbial in the traditional study of the Arabic grammar. Sibawayh himself gives credit to his teacher and mentor, Al-Farāhīdi, whom he acknowledges and quotes throughout his book (ibid 1995).

#### 3.2.1 Sibawayh's grouping of consonants

Sibawayh follows the steps of his teacher, Al-Farāhīdi, with regards to the vocal organs and the places of articulation of sounds. However, the order of sounds in Sibawayh's book is different from the order of Al-Farāhīdi. Sibawayh starts with the glottal stop *hamza* /ʔ/ and the glottal fricative /h/, followed by /ʁ/ and /ħ/; he has also ordered the /k/ before the /q/. He claims that Arabic has sixteen places of articulation (Sibawayh 1999, 4:431). In fact, they are fifteen. Table 3 displays Sibawayh's grouping of sounds based on their places of articulation.

Table 3 displays Sibawayh's grouping of sounds based on their places of articulation:

	sounds	P.O.A	description
1	ʔ h a	aqsa alhalq	furthest point of pharynx
2	ʕ ħ	wasat alhaq	middle point of pharynx
3	ʁ χ	adna alhalq	nearest point of pharynx
4	q	aqsa allisaan	furthest point of tongue with the above articulator
5	k	below the /q/	Below the place of /q/ opposite to the velum
6	ɖ ʃ j	wasat allisaan	middle of tongue opposite to the middle of the palate
7	ð	haafat allisaan	blade of tongue and the neighboring area opposite to the molars
8	n	haafat allisaan	blade and tip of tongue opposite to the above area behind the teeth
9	r l	haafat allisaan	blade of tongue behind /n/ and opposite to the above area behind the teeth
10	t <sup>ʕ</sup> d t	taraf allisaan	between the tip of tongue and the gum ridge
11	z s s <sup>ʕ</sup>	taraf allisaan	between the tip of tongue and the behind the teeth
12	ð <sup>ʕ</sup> ð θ	taraf allisaan	between the tip of tongue and the tips of teeth

13	f	batin alshafa lsufla	exolabial with the superior teeth
14	j w a ʔ	bajn alshaftein	between the two lips
15	ŋ	khayashiim	From the nasal cavity

3.2.2 Sibawayh's grouping of consonants compared to Al-Farāhīdi's and the IPA's order

We can argue that neither Al-Farāhīdi nor Sibawayh have been aware of the difference between the larynx and the pharynx. They give them the same term (*alhalq*). Consequently, they place all the

glottals and the pharyngeals under one category, i.e., the *halqiyyah*. Table 4 compares the order of sounds in Sibawayh and in Al-Farāhīdi to the order of the IPA chart based on the places of articulation of sounds.

Table 4 Order of places of articulation in Sibawayh and in Alfarahiidi and in the IPA chart

No.	Alfarahiidi	P.O.A	Sibawayh	P.O.A	IPA	P.O.A
1	ʔ ħ ʁ χ	pharyngeals & uvulars	ʔ (a) h	pharyngeals	ʔ h	glottals
2	q k	uvular & velar	ʔ ħ ʁ χ	pharyngeals	ʔ ħ	pharyngeals
3	ɖʒ ʃ ɗ	postalveolars & pharyngealized alveolar	k q	velar & uvular	χ ʁ q	uvulars
4	s <sup>ʕ</sup> s z	alveolars	ɗ ɖʒ ʃ	pharyngealized alveolar & postalveolars	k	velar
5	t <sup>ʕ</sup> t d	alveolars	j l r	palatal & alveolars	j	palatal
6	r l n	alveolars	n t <sup>ʕ</sup> d	alveolars	ʃ ɖʒ	postalveolars
7	ð <sup>ʕ</sup> θ ð	dentals	t s <sup>ʕ</sup>	alveolars	l r n t t <sup>ʕ</sup> d s z s <sup>ʕ</sup>	alveolars
8	f b m	labiodental & bilabials	z s ð <sup>ʕ</sup>	alveolars & Pharyngealized dental	θ ð ð <sup>ʕ</sup>	dentals
9	j w a ʔ	palatal & bilabial & vowel & glottal	ð θ f	dentals & labiodental	f	labiodental
10			b m w	bilabials	b m w	bilabials

Table 4 shows that the IPA chart starts with the glottals /ʔ/ and /h/. Sibawayh also starts with the /ʔ/ and the /h/. However, he classifies them as *halqiyyah* (pharyngeals). Sibawayh also inserts the /a/ as an allophone of /ʔ/ whereas Al-Farāhīdi does not start with the glottals. Rather, he starts with the pharyngeals /ʕ/ and /ħ/ and the uvulars /ʁ/ and /χ/. Again, the order of the pharyngeals in Sibawayh is similar to the order of the IPA chart except that

Sibawayh groups the pharyngeals /ʕ/ and /ħ/ with the uvulars /ʁ/ and /χ/. The uvular /q/ is listed before the velar /k/ in Al-Farāhīdi's order which is the same order of the IPA chart whereas the /k/ precedes the /q/ in Sibawayh's order. The order of the palatal /j/ which comes immediately after the velars in the IPA chart is preceded by the postalveolars /ɖʒ/ and /ʃ/ and by the pharyngealized alveolar /ɗ/ in Sibawayh's order. However, it is

grouped with the /w/, /a/ and /ʔ/ in Al-Farāhīdī's order. Because the velum or the pharynx is involved in the production of /d̪/ as a secondary articulator, it has been listed immediately after the uvular /q/ and the velar /k/ in Sibawayh's order. That makes Sibawayh's order more symmetrical to the order of the IPA chart. The order of the alveolars in both Al-Farāhīdī's order and the Sibawayh's order is almost symmetrical to the order of the IPA chart except that the pharyngealized dental /ðˤ/ is grouped together with the alveolars /z/ and /s/ in Sibawayh's order. However, Sibawayh places the dentals and the labiodental /f/ together in one group and places all the bilabials in one group. This is similar to the IPA chart whereas Al-Farāhīdī places the labiodental and bilabials together in one group.

### 3.2.3 Sibawayh distinction between voiced and voiceless consonants

Robins (1976:98) claims that the only serious observational failure in Sibawayh's phonetic description lay in not diagnosing the mechanics of the voice-voiceless distinction. Unfortunately, this claim is inaccurate. Not only did Sibawayh describe the places of articulation of Arabic sounds, but he also has gone beyond his teacher Al-Farāhīdī and divided the sounds into two groups: the first group is nineteen consonants and referred to as *majhūrah* (voiced); the second group is ten consonants and referred to as *mahmūсах* (voiceless), (Sibawayh:1982:434). Based on Sibawayh, Table 5 demonstrates sounds into *majhūrah* (voiced) and *mahmūсах* (voiceless):

Table 5 *mahmūсах* and *majhūrah* dichotomy

voiced	voiceless
ʔ a ʕ b q d̪ j d̪ l n r tˤ d z ðˤ ð	h ḥ ʁ k ʃ s t sˤ θ
b m w	f

Sibawayh's description was similar to that of modern phonetics except for three sounds: /q/, /tˤ/ and the hamza (glottal stop) /ʔ/ which are described as *majhūrah* (voiced) by Sibawayh in this dichotomy. According to Al-Ani (1995), "there is no indication that Sibawayh was aware of the function of the vocal cords, since he made no reference to the function of the glottis. Sibawayh emphasized the amount of *nafas* (breath): it is the amount of breath, or the lack thereof, that plays the role in the dichotomy of this classification". Al-Nasir (1993:38)

discusses what Sibawayh has exactly meant by the two terms *mahmūs* and *majhūr* and concludes that for Sibawayh *mahmūs* is equivalent to voiceless and *majhūr* is equivalent to both 'voiced' and 'unvoiced'. In his review of Al-Nasir's book, Al-Ani (1995:3) describes this conclusion as ambiguous and contradictory because voiceless and unvoiced mean the same thing. Al-Nasir wonders how the same feature can function in a dichotomous manner. In his effort to find an excuse for Sibawayh for considering the /q/ and the /tˤ/ as *majhūrah* (voiced), Al-Ani (1995), in his review of Al-Nasir's book, claims that the /q/ and the /tˤ/ could have been pronounced as *majhūrah* (voiced) at Sibawayh's time. We believe that this claim is difficult to prove. Al-Ani does not give any account for considering these two sounds only as voiced at that time. Moreover, if we agree with him about the /q/ which is plausible to be pronounced as /g/ in some Arabic dialects, it is difficult to explain how the /tˤ/ could be pronounced as voiced. However, Al-Ani gives a good account of the problem when he thinks that Sibawayh has focused on the amount of *nafas* (breath) to distinguish between *mahmūs* (breathy) and *majhūr* (breathless). For Al-Ani, the reasonable explanation is that these two sounds /q/ and /tˤ/ are included in the *majhūrah* because they are unaspirated. In his opinion "the amount of breath and aspiration seems to be the key to unraveling the mystery of this phonetic feature. Consequently, if we consider these two sounds as aspirated, they will fit easily into the voiced-voiceless dichotomy. However, Sibawayh did not know the function of the vocal cords. Therefore, the amount of breath or lack of it seems to be the determining factor in his classification of Arabic consonants into *mahmūсах* and *majhūrah*" (Al-Ani 1995:3-4).

### 3.2.4 Sibawayh's distinction between phonemes and allophones

Sibawayh is the first Arab scholar who distinguishes between phonemes and allophones. Although he does not clearly draw a distinction between the two phonological levels as we know them in modern phonetics, he lists twenty nine phonemes that are unanimously agreed upon to constitute the phonemic inventory of the Arabic language (see

Table 3). Allophonically, he makes a list of twenty nine phonemes plus six allophones. The six added allophones are:

- (i) the *lightnūn* [n], (nasal) [ŋ],
- (ii) the *hamza* [ʔ] that is pronounced between the glottal stop and the vowel /a/,
- (iii) the leaning *alif* (*almumālah*),
- (iv) the /j/ which is pronounced as /dʒ/,
- (v) the *sād* /s<sup>ʕ</sup>/ that is pronounced as /z<sup>ʕ</sup>/, and
- (vi) the pharyngealized *alif* /a/ as in the dialect of al-Hijāz in [assaʔa:h] "prayers", [azzaka:h] "charity" and [alħaja:t] "life".

Sibawayh also adds that the twenty nine phonemes can also be realized as forty two where thirteen allophones are different realizations of the original twenty nine phonemes inventory. He indicates that these thirteen allophones are the result of the influence of foreign languages on the pronunciation of some non-native speakers of Arabic. These allophones are:

- (i) [k] that is pronounced between the voiceless /k/ and the voiced /g/. I believe that the pronunciation of /k/ in the Sudanese dialect is similar to what Sibawayh means by this allophone,
- (ii) [dʒ] that is similar to /k/,
- (iii) [dʒ] that is similar to /j/,
- (iv) [d̥] that is weak,
- (v) [s<sup>ʕ</sup>] that is similar to /s/,

- (vi) [t<sup>ʕ</sup>] that is similar to /t/, (this is available in a sub-dialect in Ta'iz, Yemen),
- (vii) [ð<sup>ʕ</sup>] that is similar to /θ/, and
- (viii) [b] that is similar to /f/.

These eight allophones in addition to the six allophones mentioned above constitute fourteen allophones and not thirteen as indicated by Sibawayh. To draw a distinction between what is a phoneme and what is an allophone, Sibawayh emphasizes the fact that these allophones are different realizations of the original twenty nine phonemes.

### 3.2.5 Sibawayh's description of manners of articulation compared to the IPA's

Sibawayh has been aware of the three dimensions on which the description of consonants is based. By the three dimensions, we mean the state of the glottis (voiced, voiceless), the horizontal dimension (place of articulation), and the vertical dimension (manner of articulation) (Hassan and Heselwood 2011; Dickins 1999; Semaan 1968). We have discussed in section 3.2.3 and 3.2.4 the places of articulation and the voiced-voiceless dichotomy. Now, we turn our attention to how Sibawayh describes the manners of articulation (Sibawayh 1999, 4:423). Table 6 demonstrates the manners of articulation according to Sibawayh. This has influenced subsequent Arab phoneticians until the recent time.

Table 6 Manners of articulation according to Sibawayh

	manners	Sibawayh's definition	sounds	conformity to IPA
1	<i>shadīd</i> (strong or hard)	sounds with (air) being obstructed	ʔ q k dʒ t <sup>ʕ</sup> t d b	plosive and affricate sounds
2	<i>rakhwah</i> (lax or loose)	sounds with (air) being continuant	h ħ ʕ χ j s <sup>ʕ</sup> d̥ z s ð <sup>ʕ</sup> θ ð f	fricatives except for /ð/
3	between <i>shadīd</i> and <i>rakhwah</i>	similar to /ħ/	ʕ	/ʕ/ is fricative
4	deviating	it is a <i>shadīd</i> sound, but air is not obstructed; it deviates from the centre and air is allowed through the two sides.	l	/l/ is lateral; the description is almost the same like IPA.
5	<i>shadīd</i> nasal	air is obstructed in the mouth but allowed through the nose.	n m	/n/ and /m/ are nasal stops
6	mukarrar	<i>shadīd</i> but air continues for trilling; it allows air like the <i>rakhwah</i> sounds. If there no trilling, there will be no continuation of air.	r	/r/ is trill

7	<i>layyinah</i>	soft because their points of articulation is wider than the other sounds and air is allowed freely	w j	/w/ and /j/ are approximant.
8	<i>hāwi</i>	air is allowed freely more than /w/ and /j/ because you can make your lips completely rounded in /w/ and raise your tongue to the palate in /j/ but you cannot do that in /a/	a	/a/ is a resonant vowel.
9	<i>almuṭbaqah</i>	tongue covers the oral cavity	s <sup>◌</sup> ḏ t <sup>◌</sup> ḏ <sup>◌</sup>	/s <sup>◌</sup> ḏ t <sup>◌</sup> and ḏ <sup>◌</sup> / have the velum or pharynx as a secondary articulation.
10	<i>almunḡatiha</i>	oral cavity is open except for the point of contact.	All sounds except s <sup>◌</sup> ḏ t <sup>◌</sup> ḏ <sup>◌</sup>	all other sounds have a primary articulation only

We can safely conclude that although he has used different terms, Sibawayh has also employed all the manners of articulation used in modern phonetics. It is worthwhile to note that when Sibawayh uses the term *al-ṣawṭ* in his description of manners of articulation, he refers to the air stream mechanism, (Sibawayh1999, 4:433-434). Consequently, plosives, nasals, fricatives, affricates, trill, lateral and approximant have been used in his description of manners of articulation. The following observations are taken into account:

- (i) plosives and affricates are given one term (*shadīd*),
- (ii) fricatives are given the term *rakhwah*
- (iii) the fricative /ʕ/ is considered as a status between *shadīd* and *rakhwah* by Sibawayh
- (iv) /l/ is considered as a deviating sound, a term which is similar to lateral,
- (v) the nasal sound is accurately described as a *shadīd* nasal which is equivalent to the nasal stop,
- (vi) trill /r/ is given the term *mukarrar*,
- (vii) /w/ and /j/ are considered as *layyinah* (soft), and Sibawayh's description of the term means exactly the same as approximant, and
- (viii) Sibawayh's description of the term *hāwi* is in conformity with the term resonant which means that the stricture is more than the approximant.

The dichotomy of *almuṭbaqah* and *almunḡatiha* noticeably distinguishes between the sounds that require secondary articulations (*almuṭbaqah*) and

the sounds that require only primary articulations (*almunḡatiha*). Moreover, it is worthwhile to note that Sibawayh has argued that *almuṭbaqah* sounds /s<sup>◌</sup>/ will be /s/, the /t<sup>◌</sup>/ will be /t/, the /ḏ<sup>◌</sup>/ will be /ḏ/, and the /ḏ/ will never exist without *itbāq* (Dickins: 1999). We can claim that what Sibawayh mentions is accurate except for his observation about the /ḏ/ which will be /d/ without *itbāq*.

### 3.3. Ibn Sīna (Avicenna)

Ibn Sīnā is a Persian polymath who is regarded as one of the most influential thinkers and writers of the Islamic Golden Age. Of the 450 works he is known to have written, around 240 have survived, including 150 on philosophy and 40 on medicine. His most famous works are (The Book of Healing – a philosophical and scientific encyclopedia) and (The Law of Medicine – a medical encyclopedia) which has become a standard medical textbook in many medieval universities and has remained in use as late as 1650

(<http://en.wikipedia.org/wiki/Avicenna>).

#### 3.3.1 Phonetic problems discussed by Ibn Sīna

Arab phoneticians who have come after Sibawayh are influenced by Sibawayh's ideas in terms of the places and manners of articulation. These phoneticians have kept repeating Sibawayh's ideas without any critical comments or making any improvements. However, when Ibn Sīna appears, he writes his unmatched book *Asbāb ḡuddūth Al-ḡarf*. In this book, he uses phonetic terminologies and discusses phonetic and phonological concepts that are produced for the first time. He documents existing knowledge of speech acoustics and

physiology (Heselwood and Hassan 2011; Bohas et al 1990; Semaan 1968). He unprecedentedly discusses a variety of phonetic problems from different perspectives. The problems that he discusses include:

- 1) articulatory phonetics,
- 2) physics of speech,
- 3) anatomy of vocal organs,
- 4) contrastive phonetics where he contrasts Arabic sounds to other sounds of different languages, and
- 5) non-linguistic sounds and onomatopoeia.

### 3.3.2 Reason of sound occurrence

According to Ibn Sina, the reason for the occurrence of sound is the quick and forceful undulation of air as a result of two actions: *alqar'* and *alqal'*. These two terms used by Ibn Sina are equivalent to 'contact' and 'release' in modern phonetics. In his book *Al-Qanūn* (1999, 2:225) he explains "the muscle that is responsible for the sound is the larynx when it is in the opening position. Larynx is actually the first organ which produces the sound and all other organs are subsidiary and supportive. The initiation phase starts from the diaphragm and the chest muscles. The lungs are responsible for the inhalation and exhalation process and when the air reaches the larynx it is modulated and therefore the sound is produced".

Ibn Sina explains that the *qar'* (contact) is not the main reason for the production of sound. According to him, the main reason for the production of sound is the *qal'* (release) as you may have a *qar'* without producing any sound. This is exactly similar to what modern phonetics explains about the production of sound. In modern phonetics, three stages are essential for the production of sound: initiation, phonation, and articulation, (Catford 1977). In the third stage only, we have the contact and release processes where the sound is actually produced. In his book *Al-Shifa* (1966:198) he asks himself a number of questions through which he tries to lay the foundation of articulatory phonetics, acoustic phonetics, and auditory phonetics. His questions are:

- (i) Is sound only the process of *qar'* (contact) and *qal'* (release)?
- (ii) Is it the undulation and waves in the air? or

(iii) It is a third phase originated in the ears of the receiver of sound?

### 3.3.3 Anatomy of the larynx

Ibn Sina has been the first scholar to discuss the anatomy of the larynx. He divides larynx into three cartilages:

(i) *Alghoḍruf aldaraqī (altursi)* = thyroid cartilage

The thyroid cartilage, also known as the Adam's apple, is the largest and uppermost of nine cartilages in the larynx, or voice box. It houses the vocal folds, commonly called the vocal cords. The thyroid cartilage is composed of two plates, called laminae, that join in the front at an angle of 90 to 120 degrees.

(ii) *'adiim alism* (nameless) = cricoid cartilage

The function of the cricoid cartilage is to provide attachments for the cricothyroid muscle, posterior cricoarytenoid muscle and lateral cricoarytenoid muscle, cartilages, and ligaments involved in opening and closing the airway and in speech production.

(iii) *almukabbi (alṭirghāli)* = arytenoid cartilage

The arytenoid cartilage is a pair of pyramid-shaped pieces of cartilage found in the larynx (voice box) which are fundamental to the production of vocal sound. They are located on the dorsal side of the larynx above the cricoid lamina.

### 3.3.4 Order of consonants compared to the IPA's

Ibn Sina divides sounds into simple and compound:

- 1) The simple sounds are: /b, t, ḍ, d, ḍ, tʰ, q, k, l, m, n/.
- 2) The compound sounds are all other sounds: fricatives, and approximants.

This division shows the genius of Ibn Sina whose work is in corresponding to the division of modern phonetics. The first category is the stops (plosives and nasals). The sounds in this category are characterized by:

- (i) complete closure,
- (ii) air is trapped behind the two articulators, and
- (iii) sudden release.

The second category contains fricatives and approximants. These sounds are characterized by:

- (i) slight closure,
- (ii) air goes through the two articulators, and
- (iii) gradual release.

Table 7 Order of sounds by Ibn Sina compared to the IPA chart

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Ibn Sina's order	ʔ	h	ħ	ħ	χ	q	χ	k	ḏ	ʃ	ḏ	s <sup>c</sup>	s	z	t <sup>c</sup>	t	d	ḏ	ḏ <sup>c</sup>	ḏ	l	r	f	b	m	n	w	j
IPA chart order	ʔ	h	ħ	ħ	ʁ	q	k	j	ʃ	ḏ	s	s <sup>c</sup>	z	t	t <sup>c</sup>	d	ḏ	l	r	n	ḏ <sup>c</sup>	ḏ	θ	f	b	m	w	

Ibn Sina classifies sounds into consonants (*ṣawāmit*) and vowels (*ṣawāit*) (*Asbāb Huddūth Al-Harf* (1983:48). See Table 7.

When we investigate the order of consonants by Ibn Sina, we can make the following observations:

- (i) glottals, pharyngeals uvulars and velars are compatible with the IPA order,
- (ii) the palatal /j/ is listed at the end of the order as he considers the /j/ as a semi-vowel,
- (iii) the postalveolars /ʃ/ and /ḏ/ are in agreement with the IPA order,
- (iv) all alveolar sounds are in conformity with the IPA order except for the sonorants /l/ /r/ and /n/,
- (v) the dental sounds are in agreement with the IPA order,
- (vi) labiodental /f/ is in conformity with the IPA order, and
- (vii) the bilabials /b/, /m/ and /w/ are compatible with the IPA order.

#### 4. CONCLUSION

Having said the above, we can make the following concluding statements:

- (1) The contributions of the early Arab phoneticians can be found in three main areas:
  - (i) sciences of the Arabic language (grammar, morphology, syntax, rhetoric, and prosody),
  - (ii) sciences of wisdom, philosophy, medicine and music,
  - (iii) sciences of modes of reading and *Tajwīd*,
- (2) Area (i) is overwhelming in the number of phoneticians, their creativity, originality and domination over the scholars for subsequent centuries.

- (3) The most prominent figures in the first area is Al-Farāhīdi, Sibawayh and Ibn Jinni,
- (4) The number of sounds in Al-Farāhīdi's order of consonants is symmetrical to the number of sounds in the IPA chart; however, there is a mixture between consonants and vowels in Al-Farāhīdi's order.
- (5) While Al-Farāhīdi discusses only the places of articulation, Sibawayh has discussed more phonetic problems than Al-Farāhīdi, such as voiced and voiceless consonants, manners of articulation and phonemes and allophones.
- (6) Other contributors in the first area are only imitators recycling the ideas of the three major scholars (Al-Farāhīd, Sibawayh, and Ibn Jinn).
- (7) It can be observed that Ibn Jinn improves on the ideas of Sibawayh and Sibawayh improves on the ideas of Al-Farāhīdi.
- (8) The most prominent figure in the second area is Ibn Sīnawh discusses phonetic problems that have not been discussed before. He lays the foundation of acoustic and auditory phonetics and his ideas on the vocal organs anatomy are almost in line with modern anatomy of the vocal organs.
- (9) The most prominent figures in the third area are Al-Qaisi and Ibn Al-Jazari whose phonetic discussion is marked by repetition of Sibawah's ideas. However, these scholars have neither tried hard to discuss new phonetic problems nor have they benefited from Ibn Sīna's ideas. The connection they have made between phonetics and Quranic recitation has made phonetics subsidiary. Thus, for centuries, phonetics does not emerge as an

independent discipline in the study of language.

#### REFERENCES

- Al-Ani, S. (1995). Review of Al-Nasir, A (1993). *Sibawayh the phonologists: A critical study of the Phonetic and the Phonological Theory of Sibawayh as Presented in His Treaties, al-Kitāb*. Library of Arabic Linguistics 10. London: Kegan Paul International.
- Al-Hamawi, Y. (1993). *Mu'gam al-Udabā*, Dar Algharb Al-Islami, Beirut.
- Al-Hleis, Y. (1985). 'Im assawtiyyat almawji alsam'i 'ind ulama'a almuslimin alqudāma, *Arabic Journal for Linguistic Studies*, vol:3, issue:2, pp:101-123.
- Al-Makhzumi, M. (1986). *Fi Al-Nhw Al-Arabi: Naqd wa Tawjih*, Dar Al-Raid Al-Arabi, (second edition), Beirut.
- Al-Najjar, N.R. (2004). *Al-Lugha wa anthimatuha bayn alkudamā wal-Muhdathin*, Alwafā Publisher, Alexandria
- Al-Nasir, A (1993). *Sibawayh the phonologists: A critical study of the Phonetic and the Phonological Theory of Sibawayh as Presented in His Treaties, al-Kitāb*. Library of Arabic Linguistics 10. London: Kegan Paul International.
- Al-Nu'emi, H. "Al-dirasāt Allahgiyyah wa Al-sawtiyyah 'ind Ibn Jinni',
- Al-Qaisi, M. (1996). *Al-Ri'āyah litajwīd Al-Qirā'ah wa tahqīq Al-Tilāwah*, Dar Ammar, Amman.
- Al-Tayyal, M. (1994). 'Im Al-Aswāt 'Ind Al-Arab, *Journal of Arabic Language Academy*, vol:69. Damascus
- Bergsträsser, G. (1994). *Al-Tatawwur al-Nahwi lillugha al-Arabia*, Alkhanji library, Cairo.
- Bohas, G., Guillaume, J.P. and Kouloughli, D.E. 1990. *The Arabic Linguistic Tradition*. London. Routledge.
- Catford, J.C., (1977). *Fundamental Problems in Phonetics*, Bloomington: Indiana University Press.
- Dickins, J. (1999). Literal (Lit) and idiomatic (Id) translations of Sibawayh's account of the 'letters' (حرف) of Arabic. Unpublished manuscript.
- Heselwood, B. and Hassan, Z.M. (2011). 'Introduction'. In Hassan, Z.M. and Heselwood, B. (eds), *Instrumental Studies in Arabic Phonetics*. Amsterdam.
- Ibn Jinni, *Sir Şina 'at Ali'rāb*, (1982). Albabi Alhalabi, Cairo.
- Ibn Khillikan, (1972). *Wafiyyat al-A'yān*, Dar Sadir, Beirut.
- Ibn Sīna, (1966). *Al-Shifa*, edited by Abdul-Rahman Badawi, Al-Dar Al-Masriyyah li-talif wal-tarjamah, Cairo.
- Ibn Sīna, (1983). *Asbāb Huddūth Al-Harf*, edited by Mohammad Hassan Altayyan and Yehya Mir Alam, majma' Allughah Al-Arabia, Damascus.
- Ibn Sīna, (1999). *Al-Qanūn fi Al-Tibb*, Dar Al-Fikr, Beirut.
- Flesh, H., (1968) "altafkīr Alşawti 'ind Al-Arab fi dhaw 'sir Şina 'at ali'rāb libni Jinni", *Journal of majma' Allughah Al-Arabiyyah*, vol:23, Cairo.
- Omer, A. (2003). *Al-Bahth Allughawi Ind Al-Arab: Al-Tathur wa Al-Tatheer*, Alam Al-Kutub, Cairo.
- Robins, R.H. (1976). *A Short History of Linguistics*, Lowe & Brydone (Printers) Ltd, Thetford, Norfolk.
- Semaan, K.I. (1968). *Linguistics in the Middle Ages: phonetic studies in early Islam*. Leiden.
- Shadah, (1931). *Ilam Al-Aşwāt inda Sibawayh wa Indana*, *Egyptian University Journal*, Cairo.
- Sibawayh, A. (1982). *Al-Kitāb*, Al-Khanji Bookstore and Dar Al-Rifa', Ciaro and Riyadh.
- <http://en.wikipedia.org/wiki/Avicenna>