

THE PHONETICS OF SĪBAWAIH: SEGMENTS AND FEATURES

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Abstract: Sībawaih and Al-Khalīl are eighth century linguists who left behind comprehensive analyses of Arabic. Sībawaih, in his book of about 1000 pages, included a description of the sound system of Arabic. He provided both the articulatory descriptions, and a set of features that classify these sounds into natural classes and cross classify them by means of a coherent system of features. In terms of these features he analyzed the sound system of Arabic, and was able to account for the phonetic variations that occurred in the language across dialectal and tribal boundaries. By listing its segments and features one indicates its scope: /ʔ,h,A,ʕ,h,γ,x,q,k,ḏ,g,š,y,l,r,n,ṭ,d,t,z,s,ṣ,ḍ,ḏ,θ,f,b,m,w /

Keywords: *ṣaḥīyḥ, muṣṭal, maghuwr , mahmuws, šadiyd, raxw, munḥarif , ḡunnah, mukarrar, layyin , ḥāwi, muṭbaq, munfatīḥ , mustaḥliy.*

0.0 INTRODUCTION

Whatever one thinks of the eighth century, it was a banner century for Arabic linguistics in the two centers of linguistic activity, the cities of Basrah and Kūfah in southern Iraq. This presentation will limit its scope to the school of Basrah. The number and stature of the linguists at this time and place, however, rivals comparable epochs in other cultures and civilizations in which linguistics flourished and its effects have perdured. We have come to appreciate the quality of their analyses, their substantial outputs and the originality with which they approached the analysis of Arabic. Their contributions are relevant not only to the analysis of Arabic but also to linguistics as a science of language. Time constraints prevent us from giving some of the specifics of the development of Arabic linguistics and some of the traditional folklore that traces the beginnings of Arabic linguistics to particular

Arab individuals, i.e., the Caliph Ali (d.661)¹ and the linguist Abu Al-Aswad Al-Duwalī² (d. 688), among others (Fück, 1955). This is a presentation, primarily, of the fundamentals of Sībawaih's phonetics with a look at his teacher and mentor, Al-Khalīl Ibn Ahmad Al Farāhīdī. To place Sībawaih in the proper historical and linguistic perspective, one need to bring into the picture, at least in a limited way, his linguistic milieu. The only phonetic document that has come down to us about the phonetics of Arabic, prior to the treatise by Sībawaih, is the treatise of Al-Khalīl. This treatise is the first formalization of the treatment of the sounds of Arabic and it has become the point of reference for subsequent treatises. Its terminology and its classification of the sounds of Arabic have become the standard followed by the other Arab linguists. With this document in mind and with reference to it, the detailed description and analysis of Sībawaih comes into a better focus. For a more complete analysis Al-Khalīl refer to Sara (1991).³ A brief sketch of Al-Khalīl's phonetics follows.

1.0 AL-KHALĪL'S PHONETIC INVENTORY

The phonetics of Al-Khalīl comes as an introduction to his dictionary called *kitāb Al-Ṣayn*. (Al-Sāmīrāʾī and Al-Makhzūmī, 1980-1985). The treatise on phonology is in volume I (1:47-60). The arrangement of the letters of the alphabet that he devised is based on their articulatory descriptions. He began the description with the larynx and proceeded, in measured steps, towards the lips, instead of the traditional alphabetic arrangement. In the process, Al-Khalīl wrote a treatise on the phonology of Arabic, that included both a phonetic description and phonological information on the sound system of Arabic.

1.1 The Division into *ṣaḥīḥ* 'Strong' and *muṣṭal* 'Weak' letters

Al-Khalīl divided the *ḥurūf* 'letters' of Arabic into two classes he labeled as *ṣaḥīḥ* 'strong' and *muṣṭal* 'weak'. The weak have no specific *ḥayyiz* 'locale' nor *maxrag* 'exit', while the strong have both locales and exits that define their articulations.

¹Cousin of the prophet Muhammad and the 4th Caliph after him.

²He is credited with the first steps in the grammatical analysis of Arabic.

³This study provides the Arabic text, its translation, comments and analysis of the treatise.

1.2. The *muṣṭal* 'Weak' Letters

The weak letters are, by definition, not associated with any specific articulatory locales or exits, but are produced in the vocal tract as a whole, hence they are called *gawf* 'cavity' or *hawāʾ* 'air' letters: e.g.

Air/Cavity letters: w, A, y, ʔ / و, ا, ي, ؤ

1.3.0 The *ṣaḥiyḥ* 'Strong' Letters

The strong letters are groups of letters that are associated with one of the nine specific areas of the vocal tract called locales. These locales and exits proceed from the throat towards the lips in measured steps and are associated with specific articulatory areas of the vocal tract.

1.3.1 The Nine *ʾaḥyāz* 'Locales'

1.	Throat	:ʔ, ḥ, h, x, ʕ	غ, خ, هـ, ح, ع
2.	Uvula	:q, k	ق, ك
3.	Soft-Palate	:g, ṣ, ḍ	ض, ش, ج
4.	Apex	:ʃ, s, z	ز, س, ص
5.	Alveolus	:t, d, t	ط, د, ت
6.	Gingivae	:ṭ, ṭh, ḍ	ظ, ث, ظ
8.	Laminae	:r, l, n	ن, ل, ر
9.	Lip	:f, b, m	م, ب, ف

1.3.2 The Twenty Five *maxāriḡ* 'Exits'

In addition to the fact that groups of letters are associated with specific locales, Al-Khalīl associated each individual letter with a unique exit within that specific locale. For example, the throat is one locale that accommodates five exits beginning with the deepest in the throat and proceeding to the one closest to the oral cavity thus: ʔ, ḥ, h, x, ʕ : ع, ح, هـ, خ, غ, respectively, and so on with the rest of the locales.

The above inventories of the groups of letters is summarized in Chart I that provides added organizational features in addition to Al-Khalīl's terminological specifications of the vocal tract.

Chart 1. The Locales and Exits of Al-Khalīl's Letters

LETTER /harf/	LOCALE /ḥayyiz/	EXIT /maxrag/
S	1. THROAT /ḥalq/	غ د خ ه ح د ع ڤ, ḥ, h, x, ʔ
T	2. UVULA /Lahāh/	ق, k
R	3. SOFT-PALATE /šagr/	ض د ش ج ڡ, ʒ, ʃ, ʔ
O	4. APEX /ʔasalah/	ز د س ص ښ, z, s, ʒ
N	5. ALVEOLUM /niṭṭ/	ط, d, t
G	6. GINGIVA /liṭṭah/	ظ, ʔ, ḡ
/ṣaḥīḥ/	7. LAMINAE /ḍalaq/	ر, l, n
	8. LIPS /šafah/	م, ب, ف, ʔ, b, m
WEAK /muṭtall/	CAVITY/AIR /hawāʔ/	ء, و, ا, ʔ, w, A, y, ʔ

In addition to the above articulatory descriptions of the letters of Arabic, Al-Khalīl discusses also some classificatory features of these letters. But there is no detailed discussion of these cross classificatory features of speech. The ones that are mentioned are not dwelt on in detail. They will, however, be discussed more fully by Sībawaiḥ and subsequent authors. The list is not extensive, but it does include such features as the 'weak', the 'strong', the 'covered' and 'high' and similar features that can be thought of as cross classificatory features, as the subsequent traditions treated them. These cross classificatory features will play a more central role in Sībawaiḥ's analysis. Chart II includes these cross classificatory features into the overall matrix of the segments discussed by Al-Khalīl: the following is the list mentioned by Al-Khalīl:

ṣaḥīḥ 'strong', *muṭtal* 'weak', *ḍulq* 'fluency', *ṣutm* 'non-guttural', *ḥalq* 'throat', *muṭbaq* 'covered', *ṭalq* 'free', *murtafiʿ* 'high, raised'

Chart II: Feature Matrix of the Letters of Arabic

	ṣah	mu	ḍul	ṣut	ḥal	muṣ	ṭal	mur	
ṣ	+				+		+		
ḥ	+				+				
h	+								
x	+				+				
ʕ	+				+				
q	+			+			+	+	
k	+			+				+	
g	+			+				+	
ṣ	+			+				+	
ḍ	+			+				+	
ṣ	+							+	
s	+							+	
z	+							+	
ṭ	+							+	
d	+							+	
t	+							+	
ḍ	+								
ḍ	+								
θ	+								
r	+		+						
l	+		+						
n	+		+						
f	+		+						
b	+		+						
m	+		+			+			
w		+							
ʾ		+							

The above features are respectively: *ṣaḥ* = *ṣaḥīḥ* 'strong', *mu* = *muṣṭal* 'weak', *ḍul* = *ḍulq* 'fluency', *ṣuṭ* = *ṣuṭm* 'non-guttural', *ḥal* = *ḥalq* 'throat', *muṭ* = *muṭbaq* 'covered', *ṭal* = *ṭalq* 'free', *mur* = *murtafīṣ*, 'raised', *ṣaf* = *ṣafawī* 'labial'.

Since Al-Khalīl provides the only other treatise on the phonetics of Arabic at or prior to the treatise of Sībawaih, it serves as the context for what and how he will eventually conceive his phonetic system. He surely incorporates the basic conceptual framework that motivated his teacher in terms of locales and exits, i.e. the articulatory description of each individual letter and the list of features that cross classified these same letter into different grouping due to their sharing of features that reached beyond and across the articulatory locales and exits. There are differences between the two authors, to be sure, which they will be discussed in their proper places. We turn now to Sībawaih.

2.0 SĪBAWAIH (145-177A.H./ 762-793 A.D.)

Sībawaih was a student of Al-Khalīl (Al-Khalīl, 1985). He provides us with a great deal of phonetic detail that pertains to the Arabic of his time and the rich dialectal variations that were present in the spoken language, but which are not dealt with in Al-Khalīl's treatise, despite the similarity of their approaches. Even though both authors had a passion for detail, accuracy and systematization, their analyses turned out to be not identical.

Sībawaih is the most eminent student of Al-Khalīl. For all his originality and monumental contribution to Arabic linguistics, though, his name has been inextricably associated with that of Al-Khalīl for reasons that, we believe, he would be proud and appreciative of. They were linguists of the same frame of mind. Both were insightful and rigorous in their treatment of the facts of the Arabic language. Sībawaih in his book acknowledged all his teachers and their contributions to practically every aspect of the analysis of Arabic that he treated. He cites Al-Khalīl 608 times (Troupeau, 1976:428ss) and Yūnis (708-798)⁴ 217 times (Troupeau, 1976:230ss), among others. This has been interpreted by some to mean that Sībawaih stood in the shadow of his mentor(s), especially that of Al-Khalīl, e.g. l(Masʿūd, 1986). This has a grain of truth in it, but it does injustice to the originality of both Sībawaih, his teachers and his colleagues who have been respectfully mentioned in his book. Sībawaih has given us a comprehensive analysis of all aspects of Arabic that has been of enduring value and has all the marks of his originality and particular genius.

Sībawaih's treatment of phonetics is part of his treatise on the grammar of Arabic, simply called:

⁴Yūnis bin ḥabīb was one of the grammarians of the Baṣrah school and hence an authority on the proper use of Arabic.

ʿAl-Kitāb 'The Book'. The sections dedicated to the phonetic descriptions of the letters of Arabic and their features are the very last chapters of this massive book (i.e. chapters 565-571). As expected there are many chapters and subsections in the previous parts of *ʿAl-Kitāb* in which phonetic issues are discussed, e.g. *ʿImālah* 'Inclination' chapters 477-482 (Sara, 1996), *ʿAl-hamz* 'glottal stop' chapter 411, among others. In both size and content these chapters on phonetics provide the articulatory description of the letters of Arabic and the list of features that cross classify them into natural classes that reach across locales and exits. These chapters are the richest source of primary phonetic detail on Arabic that has come down to us from antiquity.

3.0 SOME PRELIMINARIES TO THE PHONETICS OF SĪBAWAIH

Sībawaih was familiar with the writing system of Arabic and knew of its organization. He expressed no objection to the system as such, but for linguistic purposes, he designed a phonetically motivated organization of the sounds of Arabic that was parallel to that of Al-Khalīl. His discussions of the letters of Arabic bring out his organizational scheme which happens to be different from the organization of the conventional system. These chapters provide, in fairly substantial detail, a rich descriptive characterization of each letter of the alphabet and a full list of their cross classificatory features.

3.1 *The Traditional Arrangement of the Letters of Arabic:*

The conventional arrangement of the letters of Arabic, as we have it now, is done, for the most part, according to the shape of the letters. The homographs, apart from the diacritical marks, e.g. ب, ت, ث, are grouped together in the arrangement of the traditional alphabet. Thus respectively.

[ا, ب, ت, ث, ج, د, ذ, ر, ز, س, ش, ص, ض, ط, ظ, ع, غ, ف, ق, ك, ل, م, ن, ه, و, ي]
[ʔ, A, b, t, θ, ǧ, ħ, x, d, ð, r, z, s, š, ʂ, dʀ, t, ð, ʕ, ɣ, f, q, k, l, m, n, h, w, y]

3.2 *Sībawaih's Re-organization of the Letters of the Alphabet: pp. 452ss :*

[ا, ب, ت, ث, ج, د, ذ, ر, ز, س, ش, ص, ض, ط, ظ, ع, غ, ف, ق, ك, ل, م, ن, ه, و, ي]
[ʔ, A, ħ, ʕ, ɣ, x, k, q, dʀ, g, š, y, l, r, n, t, ð, t, ʂ, z, s, ð, ð, θ, f, b, m, w]

Sībawaih takes the above arrangement of the orthography as a point of departure. There is agreement, in both systems, on the number and the designation of the letters. The traditional scheme groups together, as much as convenient, the letters that have similar shapes without much regard to their articulatory differences. Sībawaih, on the other hand, followed the speech production route in classifying the letters. He grouped together the sounds that share articulatory features according to accepted phonetic norms. He grouped together letters in the same locale, for example all the throat letters, and similarly with all the other locals, beginning with the throat

and ending with the lips. There is no reason to prefer the traditional classification over the linguistic classification or the reverse, except that the latter has clear advantages in phonetic analysis. The letters that share locales and exits, or have a set of features in common, tend to participate in similar phonetic processes. Hence, the progression in the above phonetic re-organization of the letters began with the pharyngeal letters and ended with the labial letters.

4.0 SĪBAWAIH'S PHONETIC SYSTEM: sixteen exits p. 453:4ss

Sībawaih re-organized the traditional system according to the locales and exits of individual letters: Sībawaih's first binary division of the letters of Arabic was into two unequal classes of sounds: the *Maghuwr* 'loud' and the *mahmuws* 'muted' p.453:17ss

4.1. *The maghuwr 'loud' : nineteen letters p. 453:17ss.*

"The *maghuwr* 'loud' letter is the one in which there is full reliance on its position. It prevents the breath from flowing along with it, until there is no longer any reliance on it and then the sound flows".

[ا,ء,ع,غ,ق,ض,ج,ي,ر,ل,ن,ط,د,ذ,ظ,ب,م,و]
[ʔ, A, ʕ, ɣ, q, d̪, g, y, l, r, n, t̪, d, z, ð, ð̌, b, m, w]

The term *maghuwr* may be unclear at first blush. But the meaning we need to associate with it is the common meaning as defined or understood by the speakers at that time. We are better served by taking as the source of our understanding of this term the meaning as defined by Al-Khalīl in *Kitāb Al-ʿayn* as: *Al-ṣaut Al-ʿālī* 'the loud voice' (Al-Farāhīdī, 1985, vol.3 pp.388,389).

4.1b *The mahmuws 'muted' letters: ten letters p.454:2ss*

"The *mahmuws* 'muted' letter is the one in which there is a weaker reliance on its position so that the breath flows along with it."

[ف,ث,ص,ت,س,ش,ك,خ,ح,ه]
[h,ħ, x, k, š, s, t, ʂ, θ, f]

This oppositional term is the complement of the *maghuwr* 'loud'. In *Kitāb Al-ʿayn* it is defined as: *ḥassu Al-ṣawti fī Al-fami mimma lā ʔiṣrāba lahu min ṣawti Al-ṣadri wa lā gahārata fī Al-manṭiqi* 'a sensation of the sound in the mouth without its enrichment from the chest nor its loudness in speech', (Al-Farāhīdī, 1985, vol. 4 page:10), and as *ʔAl-kalāmu ʔAl-xafiyyu ʔAl-mugamgam* 'a muted and soft speech'.

There is no clear indication that a specific physiological feature is being singled out in the definitions of these two terms, but rather the aim appears to be to give the general quality of the sounds as perceived by the hearer, that is, their overall auditory effects.

4.2a *The šadiyd 'tight', p. 454:6ss*

“The *šadiyd* ‘tight’ is that which prevents the sound from flowing along with it.”

[ب, ت, د, ط, ج, ك, ق, ع]
[ʔ, q, k, g, t, d, t, b]

4.2b *rixwah 'loose, continuant' p. 454:10ss*

“The *rixwah* ‘loose’ is that which permits continuance of sound.”

[ف, ذ, ث, ظ, س, ز, ض, ح, ش, خ, غ, ج, ه]
[h, ʔ, ɣ, x, ʃ, ʒ, dʒ, z, s, d, θ, ð, f]

4.3 *bajn šadijd wa rixwah 'between tight and loose'*

ʔayn ‘[ʔ]’, ع

4.4 *Al-munḥarif 'deviant, lateral', p. 454:13ss*

“The *munḥarif* ‘deviant, lateral’ is a letter through which the sound continues in accordance with the deviance of the tongue with the sound. It does not obstruct the sound like a tight letter. It is the tight letter [l]”.

‘[l]’, ل.

4.5 *γunnah 'nasality', p. 454:16.*

“*γunnah* ‘nasality’ is a sound you expel from the nose while your tongue holds the position of the letter. They are the tight letters [m,n]”.

‘[m,n]’, م, ن.

4.6 *mukarrar 'repeated, trill', p. 454:18*

“The *mukarrar* ‘repeated, trill’ is a letter in which the sound continues due to the repetitions. It

is the tight letter [r]”.

‘[r]’, ر.

4.7 *layyinah* 'soft', p. 454:20

“The *layyin* 'soft' is a letter whose exit expands for the air of the sound to a greater extent than the expansion of the others. They are the letters that have larger exits, [w,y]”.

‘[w,y]’, و, ي.

4.8 *hāwi* 'falling', p. 454:21ss

“The *hāwi* 'falling' is a letter whose exit expands for the air of the sound more than the expansion of the exists of the [y,w]. The letter with the larger exit is the *ʔalif* ‘[A]”.

ʔalif ‘[A]’, ا.

4.9 *muṭbaq* 'covered': p.455:5ss

“The *muṭbaq* 'covered' is a letter produced as you raise the tongue towards the palate. The sound is trapped between the tongue and the palate,... the sound has dual positions”

[ط, ظ, خ, ص]
[ʃ, d̪, d̪, t̪]

4.10 *munfatīḥa* 'open, uncovered': p.455:4ss

“The *munfatīḥa* 'open' are all the letters apart from the covered ones', i.e. the balance of the letters.

[ا, ب, ف, ث, ذ, س, ز, ت, د, ن, ر, ل, ي, ش, ج, ق, ك, خ, غ, ح, ع, ه, ا, ء]
[ʔ, A, h, ʃ, ḥ, ɣ, x, k, q, g, ʃ, y, l, r, n, d, t, z, s, ð, θ, f, b, m, w]

4.11. *ʔistiṭālah* 'extendedness', p. 470:2ss

The *ʔistiṭālah* 'extendedness' It is an articulatory contact that extends forward beyond one muxrag 'exit'. e.g.

[ش, خ]
[d̪, ʃ]

4.12 *ṣafiyr* 'whistle'. p.470:11

[ص,س,ز]

[z, s, ʃ]

A detailed display of Sībawaih's articulatory parameters in describing the letters by specifying the upper and the lower articulators of Arabic letters are shown, in summary fashion, below in Chart III,

Chart-III: letters, their exits and their articulators

Upper Articulator?	<i>muxrag</i> 'exit'	lower articulator
throat:farthest section throat:mid section throat:section closest to oral cavity	ʔ, h, A / ء, ه, ا ʕ, h / ع, ح ɣ, x / غ, خ	throat:farthest section throat: mid section throat:section closest to the oral cavity
palate: farthest section palate: pre-farthest palate: mid section palate:molar region palate:above pre-molars, canines and incisors palate:above the incisors palate:above the incisors	q / ق k / ك g, ʃ, y / ي, ش, ج d̥ / ض l / ل	tongue: farthest section tongue: lower than [q] tongue: mid section tongue: beginning of edge tongue:closest edge to the tip
palate:base of incisors palate:slightly above the incisors	n / ن r / ر	tongue:edge tongue:the slightly inner surface of the tongue
teeth:tip of incisors teeth:tips of upper incisors	t, d, t / ط, د, ت z, s, ʃ / ص, س, ز	tongue:tip tongue:tip
lip:upper nose	ʔ, d̥, θ / ظ, ذ, ث f / ف b, m, w / و, م, ب light [n] / ن	tongue:tip lip:inner part of the lower lip lip:lower nose

Sībawaih is rather sparse in the divisions of the upper, i.e. passive articulators. There are only four divisions: the throat, the palate, the teeth and the lips. The palate will be sub-divided into

nine sub-sections during the description of the sounds. There is, however, a great deal of detail in the specifications in the descriptions of the active articulators, e.g. the lingual engagements in these description of the letters of Arabic, even though he does not mention the apex as such in his descriptions.. Sībawaih is very particular about the contacts of sub-sections of the tongue with the the corresponding sub-sections of the palate and the teeth in the production of each letter. Once Sībawaih's descriptions leave the throat, which he sub-divided into two sub-sections, and enter the oral cavity, they become micro-descriptive in that he expends a great deal of effort in specifying, in detail, which particular section of the tongue is in contact with which part of the palate or with which subset of teeth for each letter or group of letters. The chart above summarizes the particulars of such contacts. In specifying such articulatory maneuvers the progress is from the back of the oro-pharyngeal cavity towards the lips. Consequently the farthest and the deepest sounds would be towards the throat, i.e. the farthest from the lips, and the closest would refer to the sounds produced towards the lips. This arrangement is the reverse of the arrangement that has prevailed in the phonetic studies in the West, but it is similar to the Indian tradition of doing phonetics, from Pāṇini (Pāṇini,1987:6ss) on to the subsequent analyses.

5.0. THE FEATURES OF THE LETTERS OF ARABIC ACCORDING TO SĪBAWAIH

The above descriptions provide the details of the articulations of each individual letter or group of letters that are produced at the same *muxrag* 'exit'. But in addition, Sībawaih, provided additional classificatory features that group together sounds that share the same feature even though they are not produced at the same *ḥayyiz* 'locale' or *muxrag* 'exit'. The addition of these groupings completes his descriptions of the sounds of Arabic as a system that is coherent and self-contained. These cross classificatory features, as detailed in Sībawaih's system, are shown in Chart IV below:

Chart IV. Sībawaih's List of the Cross Classificatory Features

	ʔ	h	ʾ	ʿ	ḥ	ḡ	x	q	k	ḏ	g	š	j	l	r	n	ṭ	d	t	z	s	š	ḏ	ḏ	θ	f	b	m	w
mg	+		+	+		+		+		+	+		+	+	+	+	+	+		+			+	+			+	+	+
mh		+			+		+		+			+							+		+	+			+	+			
šd				+				+	+		+			+	+	+	+	+	+								+	+	
rx		+			+	+	+			+		+								+	+	+	+	+	+	+	+		
mn														+															
ɣn																+												+	
mk															+														
ly													+																+
hw			+																										
mṭ										+							+						+	+					
mf	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+		+	+	+	+			+	+	+	+	+	+
ms						+	+	+		+						+						+	+						
sṭ										+		+																	
sf																				+	+	+							

The fourteen features that characterize each letter are indicated with the [+]. The features are respectively: *maghuwr* 'loud', *mahmuws* 'muted', *šadiyd* 'tight', *rixw* 'loose', *munḥarif* 'deviant', *ɣunnah* 'nasality', *mukarrar* 'repeated', *layyin* 'soft', *hāwi* 'falling', *muṭbaq* 'covered', *munfatīḥ* 'opened', *mustaṣliy* 'raised', *mustaṭīyl* 'extended', *ṣaḫīr* 'sibilant'.

The above two charts for Arabic and the corresponding English list of features provide, in a summary fashion, the articulatory descriptions and the feature analysis that Sībawaih had isolated in classifying the letters of Arabic. As is apparent, the feature pairing is bilateral, each feature is opposed to what is considered its opposite. In this manner he has sub-classified the letters into natural classes which would be used in the formulation of his phonological process.

6.0. THE TREATISES OF SĪBAWAIH AND AL-KHALĪL

The treatises of Al-Khalīl and Sībawaih are the two major sources of the particulars of Arabic phonetics that have come down to us from antiquity. Their sum total of the characterizations and specifications of the letters of Arabic give the fullest description of the letters of Arabic. They complement each other well and what is left unsaid in one is supplied by the other. There are, however, similarities and differences in three basic areas: the articulatory descriptions, the list of features, and the over all organizational arrangement of the letters of Arabic.

6.1 *The Articulatory Descriptions*

It will be easily noticed that Al-Khalīl shows a clearer schematized perception of the articulatory apparatus into sub-divisions of the vocal tract, he called locales, than Sībawaih. In his descriptions, Al-Khalīl clearly distinguishes between the *ḥayyiz* 'locale' and *maxrag* 'exit'. His locales correspond unalterably to what the phoneticians would do in later analyses in subsequent centuries. Locales such as : pharynx, uvula, velum, apex, alveolae, gingivae, laminae, and lips have come into the public domain of the descriptions of sounds.

For his student, Sībawaih, for some unexplained reason, such locales do not come prominently into play. There is no mention of the uvula, velum, apex, alveolae, gingivae, or laminae in any systematic way in Sībawaih. He makes do with correlating the relative sub-sections of the lower articulators, albeit meticulously described, with those of the upper articulators. So, for example, he refers to one of the nine sub-divisions of the palate and to one of the ten sub-divisions of the tongue with relation to the nearest or closest set of teeth from the molars to the front incisors in the description of the relevant letters. This is clear and understandable in all its details and particulars, but it lacks the overall conceptual framework that had been delineated by his teacher, with such clarity and originality, in his own treatise. Sībawaih is very precise in terms of his micro-divisions of the oral cavity especially the palate and the tongue, in locating the articulatory position of each letter or group of letters in the processes of speech production. This goes beyond what Al-Khalīl had done in his descriptions. In putting these two analyses together one is in possession of the full description of Arabic that the linguists of the eighth century had about the articulation of the letters of Arabic. Comparison of Chart I with Chart III above highlights the differences between the two treatises.

In a departure from the approach of his teacher who had assigned a unique exit to each letter of the alphabet, Sībawaih assigns groups of letters to the same exit. In Chart III for example one can see that the throat is divided into three exits, to each of which a number of letters are assigned. The farthest, the middle and the closest respectively:

throat:farthest section	ʔ, h, A ء, ه, ا
throat:mid section	ʕ, h ع, ح
throat:section closest to oral cavity	ʕ, x غ, خ

This procedure is followed with the rest of the exits. Needless to say these would have been separate and distinct exits in Al-Khalīl. In Al-Khalīl no two letters have the same exit. In this arrangement it is not to be overlooked that Sībawaih does not separate the *ṣaḥīyḥ* 'strong', *muṭtal* 'weak' letters in these classifications, which was a basic division in Al-Khalīl.

6.2. The List of Features

In the discussion of features that go beyond the specifications of locales and exists, Al-Khalīl is not detailed. Even the features that he mentions, are not all properly utilized, and some obvious ones are left unmentioned. To illustrate briefly, the feature 'covered' is mentioned in Al-Khalīl but poorly and incompletely illustrated. It is mentioned in the context of [m] only, while all the other covered consonants are left unmentioned. Further, the nasals are not grouped into their own class. Other features like *ḍulq* 'fluency' and *ṭalq* 'freedom' are not mentioned nor dwelt on by Sībawaih. Without going into the details of their phonological class membership, these latter two features do not group together natural classes that enter into phonological processes as a class. They do, however, have an important lexical provenance in that their frequency of occurrence was relevant to the lexical formation of certain classes of words like quadri-radicals and quinque-radicals and to the arabicity of words. This might bring to the fore the emphases of the two authors, one is lexicological and the other is phonological.

The list of features that Al-Khalīl singles out does not begin to compare, neither in completeness nor in thoroughness, with Sībawaih's list. Sībawaih defines and discusses the cross-classificatory features in his treatise. Unquestionably, the treatment of the features in Sībawaih is a fully developed analysis. His treatise was to be complete not only in terms of elements of the system but in its accountability for the phonological processes that explained the changes and the variations in lexical forms of the language. Most of these phonological processes are discussed and illustrated using these features, in particular in the chapters on *ʔidyām* 'assimilation'. Sībawaih lists fourteen features, cf. Chart IV. These features have become part of the phonetic linguistic heritage of the Arabs. These features aptly characterize the sounds of Arabic, are operative in its phonological processes, and are markers for its dialectal differences that the author so meticulously documented in his book. In addition, one may add that this inventory of features is the one that is still currently discussed in phonetic treatises, both by Arabic and non-Arab phoneticians and phonologists, with only minor adjustments for particular languages, none of these features have been found to be redundant.

Were we to combine and mesh the two treatises, setting aside for the moment the contributions

of all the other members of the school at that time, we will be able to arrive at a fairly sophisticated understanding of phonetics by the Arab linguists of Basrah School in the eighth century.

6.3 *The Overall Organization of the System*

The systematic organization of the sound system of Arabic is preserved in both authors. That being said, one does not expect identical organization between the two authors in such early stages of the development of the discipline. Still, one is struck by the overall similarity of the outcome of the two analyses, but one also notices obvious differences, not all of which are trivial.

6.3.1 *The ṣaḥīḥ 'strong' and muṣṭal 'weak'*

Al-Khalīl had a major division of the letters of Arabic into 'strong' and 'weak' letters. This division would be used in the classification of the roots in the lexicon, but it also divided the letters into two separate groups. Sībawaih, on the other hand, does not make use of this division in his listing. All the letters for Sībawaih, including the weak ones, are positioned in the vocal tract in terms of their particular exits. This is not say that he was unaware of the distinction, since he makes systematic use of it in the morphological discussions of the weak and the strong roots.

6.3.2 *The ṭaḥyāz 'locales'*

Al-Khalīl clearly marks the vocal tract into distinct zones of articulation each one called ḥayyiz 'locale'. This included both active and passive articulators along both the upper and lower perimeters of the vocal tract. cf. Chart I. There is no clear zoning of the vocal tract into distinct locales by Sībawaih. cf. Chart III.

6.3.3 *The maxāriḡ 'exits'*

In Al-Khalīl there are as many exits as there are strong letters. i.e. 25 exits. In Sībawaih there are sixteen exits. Contrary to the teaching of his teachers, he has letters share the same exit as shown in Chart III. In addition, the weak letters have been assigned their own exits along with the rest of the letters according to their appropriate articulatory active and passive articulators.

6.3.4 *Appropriate Class groupings*

In Al-Khalīl the listings of the letters occurs twice with identical sequencing. This listing follows the order in which he places his locales. cf. # 1.3.1. The two lists have similar groupings of the

relative position of each letter within the group. In Sībawaih there is only one complete listing at the beginning of chapter 565. In subsequent sections and chapters, however, he provides a detailed description of individual letters and groups of letters which he, occasionally, re-arranges the sequence in the primary list, so the relative position of each letter may vary. e.g. the positions of [k,q] are different in the primary list but when he describes their articulations, [q] is the deeper of the two instead of the reverse as it occurs in the primary list. cf. # 3.2 and Chart III.

6.3.5 *Variations within Groups*

There is variation between the two authors on the relative sequencing of some of the groups of sounds, as one proceeds from the throat towards the lips. e.g. In Al-Khalīl one finds the following sequencing : cf. Chart I.

ṣ-group + ṭ-group + ḍ-group + r-group

as different from the corresponding groups in Sībawaih : cf. Chart III.

r-group + ṭ-group + z-group + ḍ-group

The sequence in which the members of each of the above groups occur is not identical in the two authors. Since Sībawaih makes no specific use of the 'locales' in the same conscious effort used by his teacher, his classification within some groups is quite different from that of his teacher. The throat locale in Al-Khalīl is a bit mixed up as to where each letter occurs and the proper sequence of the letters. It certainly does not correspond to what we know about the articulation of the throat letters, making allowances for the exclusion of the larynx whose function they were not aware of. Sībawaih, however, has the sequencing correctly placed and in accordance with what we now know about the articulation of these sounds, with the same allowances made for the omission of the larynx.

The case of the palatals and velars is interesting since the inclusion of the [g,d'] among the velars or the palatals puts them at a distance from their current positions as alveolars. In both authors they are grouped with the velars and palatals and not with the alveolars.

This sequencing and relative positioning of the letters may not be trivial if we are to understand the speech habits of the speakers of that era and all the dialectal variations that might have influenced one or the other of the writers.

6.3.6 *Phonetic Details*

If Al-Khalīl is a master of the systematic organization, Sībawaih is the master of the phonetic detail. The teacher is sparing in his particulars of articulation, the student is rich in the specification of the phonetic detail. It is in the accuracy and precision of his descriptions that Sībawaih shows his mastery of the phonetics of the language. He gives invaluable information on the production of the letters, and it is here also that some discrepancies show up in the different parts of his treatise and his differences with Al-Khalīl.

6.3.7 *The Features*

If Sībawaih is thorough in his articulatory descriptions of the letters of Arabic, he is a master in capturing the distinctive features that cross classify these letters into natural classes that specify the phonological processes that determine the changes that occur in the language. Al-Khalīl, in his treatise, did not dwell on the features. Sībawaih, on the other hand, was thorough in listing all the features that characterize the sound system of Arabic as he was thorough in the articulatory descriptions of the letters. If he had included the 'strong' and 'weak' features in his inventory of features, his list would have been complete and exhaustive. Yet despite that omission, it is a remarkable feat of phonetic analysis of Arabic from such an early date as the eighth century. If it had been known to us, it would have hastened the use of features in the subsequent phonetic analysis. The use of features came into practice among phoneticians only recently. Some of the serious attempts were only in this century. Prague School linguists (Troubetzkoy, 1969) and in the United States, it had to wait until the Jakobson, Halle Fant published their monograph in 1951.

In Summary then, we can say that the phonetic studies were well represented in Basrah by Sībawaih and Al-Khalīl. There appears to have been a general agreement on the proper approach to doing phonetics, i.e. that it be articulatory and precise. The linguists distinguished themselves from the generalist in language studies by providing a phonetically motivated sound system with proper articulatory description for each of its letters.

The above presentation for all its details, is but an incomplete piece of the total picture of the phonetics of Sībawaih. A complete accounting can not be given, until the whole of his book has been translated and carefully analyzed. However, the composite picture obtained from the two linguists of their practices and understanding of phonetics gives evidence of the care and precision they expended on phonetic studies. It also gives evidence that phonetics was the concern of phoneticians as well as of lexicographers, among others, and that their point of view did influence the outcome of their analyses. This type of careful study was to characterize the school in its study of all the other components of language as evidenced by the details of the lexicon and grammar of Arabic found in *kitāb Al-Ṣayn* and *Al-Kitāb*, respectively. Due to their efforts, we are wiser and richer in our linguistic lore.

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