

AN ANTHROPOLOGICAL LINGUISTIC STUDY OF PHARYNGEAL SOUNDS ROLE IN ARABIC BEDOUIN DIALECTS OF THE ARABIAN PENINSULA[§]

Nasser Al-Horais^{*}

Abstract: This is an anthropological linguistic study that tries to investigate the role of the presence of pharyngeal sounds in some Arabic Bedouin Dialects of the Arabian Peninsula in terms of changing the words structure of these dialects phonologically as well as morphologically. These changes are considered to be as a result of a combination of two factors: (i) the environment nature effect in the way of articulating these sounds, and (ii) application of specific morphological or phonological rules due to the presence of a pharyngeal sound in the word. These rules lead, only in these dialects, to significant morphological and phonological processes such as changing syllable structure, deletion, mutation, and assimilation.

Keywords: pharyngeal sounds, Arabic Bedouin Dialects, syllable structure, *gahawa* syndrome.

INTRODUCTION

The pharyngeal sounds, which are rarely used among the languages of the world, are considered to be one of the unique characteristics of Semitic language group (Zsiga 2013). Pharyngeal consonants can be produced by placing the tongue root closer to the back wall of the pharynx (Davenport and Hannahs 1998). In other words, “pharyngealised sounds involve a lowering of the back of the tongue and a retraction of the root, thus effecting a narrowing of the pharynx” (Rogers 2000: 206). The class of pharyngeal speech sounds is particularly frequent in Semitic languages such as Arabic (Al-Ani, 1970; Elgendy 1982, 1992, 2001) and Hebrew (Laufer and Condax 1981). These sounds may also occur in language families unrelated to Arabic, e.g., Caucasian (see Catford 1983).

The aim of this paper is to consider the morphological and phonological features characterizing the Arabic Bedouin dialects of the Arabian Peninsula due to the presence of a pharyngeal sound in the word. The current paper also examines the anthropological reasons behind these linguistic features. The data used by the paper, have been collected from two main sources. The first one is three text books which studied several linguistic phenomena in these dialects. These, according to their relative importance, are:

^{*} Professor. Department of Arabic Language, College of Arabic Language and Social Studies, Qassim University, K.S.A., *E-mail: nasser-alhorais@qu.edu.sa*

[§] First and foremost, I would like to express my deepest gratitude to Qassim University for supporting this work. I am grateful to Dr. Ahmad Elgendy for reading the first draft of the manuscript, and for help in tracking down data and providing me with some important references. All errors are my responsibility.

- (i) Matar (1967) *Lahjat al-Bado Fi Egleem Sahel Maruot* “the Bedouin Dialect of Egleem Sahel Maruot”.
- (ii) Al-Matlabi (1978) *Lahjat Tamim wa- atharuha Fi al-Arabiyyah al-mowahhadah* “Tamim Dialect and its effect in classical Arabic”.
- (iii) Anees (1992) *Fi Allahajat al-Arabiah* “in Arabic dialects”.

The second one is sample words, taken, by the researcher, from some native speakers of Bedouin dialects within the framework of anthropological linguistics using ethnography or participant observation by gathering data directly from native speakers of these dialects. “The central idea behind this approach is that the linguist can get a better understanding of a language and its relation to the overall culture by witnessing the language used in its natural social context” (Danesi 2004: 7).

The paper is divided into the following sections. Section 2 illustrates the use of Pharynx in speech production and its interaction with other sounds before giving, in section 3 & 4, a descriptive study of how these sounds were described by early Arab and modern phonologists in classical Arabic in order to understand the nature of this class of speech sounds. Section 5 investigates the role of pharyngeal sounds in changing the words structure of Arabic Bedouin dialects of the Arabian Peninsula phonologically as well as morphologically. Finally, section 6 concludes the paper by summarizing some gained results.

THE USE OF PHARYNX IN SPEECH PRODUCTION AND ITS INTERACTION WITH OTHER SOUNDS

The vocal tract can be seen as a continuum where constrictions can take place at various locations during the process of speech production. Conventionally, the vocal tract, when constricted at a given point, is divided into two compartments, i.e., front cavity and back cavity (see Figure 1). In languages which make use of more inferior places of articulation than the level of the uvula, such as Arabic, the front cavity is mainly the area in the oral cavity from the lips to the soft palate. The back cavity, then, comprises the area from the level of the soft palate down to the surface of the laryngeal inlet, i.e., oro-pharyngeal and laryngeal-pharyngeal cavities. The back cavity is coupled to the nasal cavity via the velopharyngeal port. Pharyngeal consonants are difficult to produce by non-native speakers. It also seems that pharyngeal segment production is relatively complex even for native speakers.

As indicated in **Figure 1** above, the pharynx, being coupled to the nasal, oral and laryngeal cavities, has a strong anatomical link with various articulators in the vocal tract. There are several observations which suggest that the production of pharyngeal consonants is complex. The pharynx, being coupled to the nasal, oral and laryngeal cavities, has a strong anatomical link with various articulators in the vocal tract. In fact there are several observations which point out to a possible

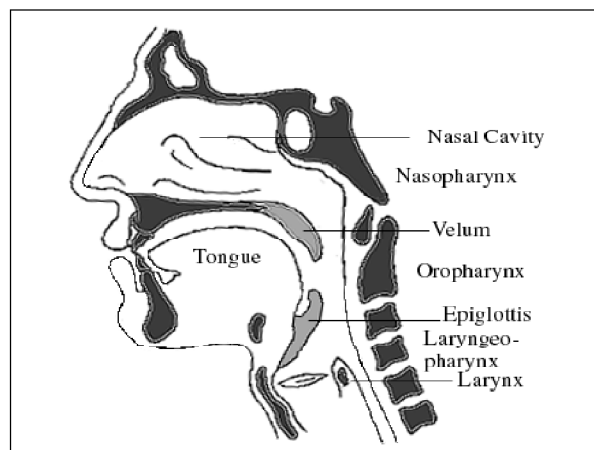


Figure 1: The shape of the vocal tract showing the three divisions of the pharyngeal cavity, i.e., the nasopharynx, the oropharynx and the laryngeopharynx (after Elgendy 2001)

interaction between nasal, pharyngeal and laryngeal articulation (see Hetzron, 1969, Trost, 1981, Elgendy 2001).

THE ROLE OF THE EARLY ARAB PHONOLOGISTS IN DESCRIBING PHARYNGEAL SOUNDS

The earliest description of the articulation of the pharyngeal sounds was made by Sibawayhi¹ (8th Century, 1977 edn, 4/ 433) when he divided Arabic letters into groups according to their places of articulation. This indicates that he understood the structure of vocal tract (Al-Nassir 1993: 14).

Sibawayhi starts his description of the places of articulation by stating that “Arabic letters have sixteen “outlets” (Sibawayhi, 1977: 433). The first three articulations were occurring in the area he called *Halq*, which apparently includes the larynx and pharynx up to the velum. However, Sibawayhi categorized pharyngeal sounds into three subdivisions. In the farthest part of the larynx he places the three letters: (i) Hamzah (ء) [ʔ] such as in /ʔant/ “you: masculine”. (ii) Ha: ھ [h] such as /huwa/ “he”. (iii) Alif ا [a:] such as /ma:ʔ/ “water”, in the middle part the two letters: (i) Ayn ع [ʕ] such as /ʕomor/ “age”. (ii) Ha: ھ [ħ] such as /ħa:r/ “hot”, and in the nearest part the two letters: (i) Ghayn غ [G] such as /Golam/ “a boy”. (ii) Kha ڤ [x] such as /al-xamr/ “alcohol” (Sibawayhi 1977).

Regarding the manner of articulation of this class of sounds, Sibawayhi classifies them into two categories *Majhur* (voiced) and *Mahmus* (voiceless)². He also classifies them into *Shadid* (affricate) and *Rikkw* (fricative) (Sibawayhi, 1977). Table 1 illustrates the manner of articulation of the Arabic pharyngeal sounds from the viewpoint of Sibawayhi (1977).

Sibawayhi had defined three pairs of back consonants in terms of their place of articulation in the throat. The pair /ʔ, h/ have their place of articulation farthest down in the throat. As for the pair /ħ, h/ their place of articulation is in the middle of the throat and finally /q G X/ have their place located highest in the throat. In addition, his classification also made a distinction between voiced and unvoiced (voiceless) sounds among pairs of consonants in Arabic. The terms “mahmos” (hamas “to whisper”) and “maghor” (gahar “to speak loudly”), indicate voiceless and voiced, respectively. Thus, for instance, the sounds /ħ/ and /G/ were classified as voiced while the sounds /ʔ/h/ and /x/ are considered as voiceless sounds of the throat.

In addition to the true pharyngeals, Sibawayhi recognized that the set of the plain oral consonants /t, d, s, z/ has counterpart pairs, which involve, in addition to their primary place of articulation in the oral cavity, superimposed constriction in the pharynx. He differentiated the sounds of the throat, i.e., pharyngeal and laryngeal consonants, from the pharyngealized consonants. He gave the term “the covered sounds” to the pharyngealized consonants since, he postulated, the contour of the tongue blade is covering (parallel or closer to) the surface of the soft palate (being retracted) during their production. The comparison was made according to the shape of the tongue during the plain set of oral dental consonants and that during the sounds of the throat (i.e., pharyngeals). Sibawayhi’s definition points out that pharyngealized consonants involve only the tongue in their production and that the pharyngeal constriction associated with these consonants is attained by retracting the back of the tongue in the throat.

The early Arab phonologists after Sibawayh repeated his classification of the pharyngeal sounds in terms of the manner of articulation. However, Ibn Jinnî (10th Century, edn 1993) disagrees with Sibawayh as to the place of articulation of the two fricatives /x/ and /G/. Ibn Jinnî suggests that the location of these two fricatives is in a place above that of /ħ/ and /h/.

TABLE 1: THE MANNER OF ARTICULATION OF THE ARABIC PHARYNGEAL SOUNDS FROM THE VIEWPOINT OF SIBAWAYHI (1977)

Letter's Name	IPA	Voiced	Voiceless	Affricate	Fricative	Affricate & fricative	Example
Hamzan	[ʔ]	√		√			/ʔahmaʔ/
Haaʔ	[h]		√		√		/hawaʔ/
Alif	[a:]	√			√		/ma:ʔ/
Ayn	[ʕ]	√				√	/ʕurs/
Haaʔ	[ħ]		√		√		/ħa:b/
Ghayn	[G]	√			√		/Garb/
Khaaʔ	[x]		√		√		/xubz/

THE ROLE OF MODERN ARAB PHONOLOGISTS IN DESCRIBING THE PHARYNGEAL SOUNDS

Since the beginning of 19th century, there has been a great deal of interest from the modern Arab and western linguists in studying Arabic language under the umbrella of modern linguistics science. This required the use of phonetic laboratories in order to analyze and synthesize Arabic sounds³. That, in turn, greatly helped to examine the description of Arabic sounds that was made by the early Arab linguists.

The class of pharyngeal consonants drew remarkable attention of the modern Arab phonologists. However, after a careful acoustical examination of these sounds using the sophisticated technology found in phonetics laboratories, it was surprisingly noticeable that the pharyngeal sounds in Arabic are only two sounds: (1) 'Ayn ع [ʕ] such as /ʕomr/ age. (2) Ha: ح [ħ] such as / ha:r/ hot. However, all the remaining consonants are not pharyngeal sounds. The sound of Alif ا [a:] is considered one of the Arabic vowel sounds⁴ according to the results that reported by some experiments that done by the modern phonetics laboratories (Anees, 1995: 117). On the other hand, the place of the two sounds: (1) Hamzah (ء) [ʔ]. (2) Ha: هـ [h] are glottal sounds which are produced in the larynx (Beshr 1980: 90). Finally, the last two sounds: (1) Ghayn غ [G] and (2) Kha خ [x] are velar sounds that produced with the tongue touching the roof of the mouth behind the center (Beshr 1980).

We find it necessary to discuss here the reason that made the early Arab phonologists to consider these sounds to be a part of pharyngeal sounds. In this context, Al-Nassir (1993:14) states that *Halq* (meaning the back region of the vocal tract), might be in Sibawayhi's view, includes the larynx and pharynx up to the velum.

Regarding the manner of articulation of pharyngeal sounds from a modern linguistic point of view, the Ayn ع sound [ʕ], in most of the varieties of contemporary spoken, Arabic is realized as voiced pharyngeal approximant⁵ (Al-Nassir 1993:47). However, Al-Ani (1970), in his acoustical and physiological investigation of Arabic, considers the Ayn [ʕ] as a stop consonant as observed in the speech of one Iraqi speaker. He stated that "After a thorough acoustical analysis, the author has found that most common allophone of the Ayn [ʕ] is actually a voiceless stop and not a voiced fricative" (Al-Ani 1970:89). After examining the data from several Arab informants, found that Ayn [ʕ] alternates between a stop and a fricative:

The most common allophone of the Ayn [ʕ] (ع) for all of the Iraqi informants is a voiceless stop. With informants from other Arab countries it seems to vary. For most parts, the most common allophone seems to be a fricative except for Kuwait and Saudi Arabia where it seems similar to the Iraqi [ʕ] Ayn (ع) (Al-Ani 1970: 91).

The other pharyngeal sound ح [ħ] does not present such a problem. It appears as a voiceless fricative (Beshr 1980).

THE EFFECTS OF ARABIC PHARYNGEAL ARTICULATION ON THE BEDOUIN DIALECTS OF THE ARABIAN PENINSULA

The Arabian Peninsula⁶ is the homeland of the Arab Bedouin⁷ tribes (see Appendix 3). Appendix 3 shows a map illustrates the distribution of ancient Arabic trips in the Arabian Peninsula. The second map in Appendix 3 represents the location of the Arabian Peninsula relative to Arabic Gulf region. All dialects in this area are more conservative than the dialects outside the peninsula. Arabic Bedouin dialects have several linguistic phenomena that are inherited from classical Arabic or as a result of language development.

In the following section, we turn to consider the role of this class of speech sounds in two levels: (i) changing the position of syllable structure, and (ii) changing the words structure morphologically as well as phonologically. In order to examine the effect of the presence of a pharyngeal consonant on both levels, a set of words was selected. Appendix 2 shows the list of Arabic words reported in the present study and their English gloss.

Syllable structure changes⁸

It has been highly observed in Hijazi dialect that there is an effect of pharyngeal articulation on syllable structure. Pharyngeal consonant favors to occupy syllable initial rather than medial or final position in a word (Mrayati 1987). Lower pharyngeal consonants tend not to favor to join consonant clusters with other than a pharyngeal consonant. There are several examples where a low back vowel is inserted between two consonants when either of the consonants is a pharyngeal consonant (see appendix 2). This is also referred to as delaying the articulation of /ʕ/ following geminate (double) consonants, which is attained by inserting a schwa before /ʕ/or the tendency to de-geminate a cluster, i.e., separating the pharyngeal consonant from the non-pharyngeal consonant before it by a vowel.

In several Bedouin dialects, insertion of a low back vowel /a/ before a pharyngeal or laryngeal consonant has been observed (Blanc 1970, Al-Mozainy1981). This phenomenon is known as the “*gahawa syndrome*” which is associated with dialects of Bedouin origin (de Jong 2007). In a word containing a back consonant, i.e., pharyngeal or laryngeal, as in the word /gahwa/ “coffee”, a low vowel is inserted after that consonant. The insertion of a schwa before the voiced pharyngeal /ʕ/ when preceded by a geminate consonant is referred to as articulatory delay of /ʕ/ as observed in these dialects (De Jong 1999).

Morphological changes

According to the data we collected for the present study, it was clearly observed that pharyngeal sounds play a significant role in changing the words structure of some of these dialects morphologically. Based on the available data (see Appendix

2), this morphological change, which caused by the effect of the pharyngeal sounds, can be classified into two main categories:

Changing the verb structure

When the second or the third root phonemes⁹ in Arabic present simple verb is one of the pharyngeal sounds, the second root phonemes must be followed by a short vowel that is called in Arabic *fatha /a/*¹⁰. For instance, /yaDhabo/ (يَذْهَبُ) “he goes”, /ya-rħalu/ (يَرْحَلُ) “he departs”. The reason behind this phenomenon is that *fatha /a/* is the most appropriate short vowel to occur in the vicinity of pharyngeal sounds¹¹ (Matar 1967: 123).

Changing the noun structure

In these dialects people change the short vowel *fatha /a/* to the short vowel *Kasra /i/* and that in the case when a pharyngeal consonant occurs in between a short and a long vowel. For example, the word /Shaħiir/ (شَعِير) “barley” is pronounced in Bedouin dialects as /Shiħiir/ and that because the short vowel *Kasra /i/* is from the (*yaħ/ y:i/ is considered as one of the long vowels in Arabic. And hence, this change is occurred to be appropriate for the glide sound [y:] after the pharyngeal consonant Ayn [ħ] (Shaheen 1966).*

Phonological changes

From a descriptive study of the data collected, the phonological changes, which occurred due to the effect of the pharyngeal sounds, can be noticed in three phonological phenomena:

Deletion

It has been observed in these dialects that the pharyngeal sounds position cannot be after the glottal stop when the glottal stop is at the beginning of a word followed directly by a pharyngeal sound which is at the end of a syllable coda. In this case, these dialects used to omit the glottal stop. For instance, the following words are pronounced in classical Arabic and in MSA (Modern Standard Arabic) e. g., /ħaħma/ (أعمى) “blind man”, /ħħmar/ (أحمر) “red”, /ħaħmaam/ (أعمام) “uncles”. However, these words are pronounced without the glottal stop in these dialects, i.e., /ħama/ (عمى), /ħmar/ (حمر), /ħmam/ (عمام) (Matar 1967).

Anees (1992) tried to find a phonological interpretation for this phenomenon. In his opinion there are two reasons that force these dialects to omit the glottal stop. Firstly, Bedouin tribes in this area are used to speak fast. Therefore, they omit the [ʔ]. Secondly, the place of articulation of pharyngeal sounds and glottal stop is very close to each other. Accordingly, there is a difficulty in articulating the two sounds which force the speakers of these dialects to omit one of them.

Consonant mutation¹²

One of the most common phonological phenomena in Bedouin dialects of Arabian Peninsula is consonant mutation. This kind of mutation sometimes occurs due to the influence of a neighboring pharyngeal sound or in order to avoid the effect of a strong sound in the vicinity of a pharyngeal consonant within the word. Below we present an account suggesting how to analyze these two types of mutation:

First mutation case

It has been observed that the dialect¹³ of Tameem tribe, which lives in the middle of Arabian Peninsula, used to articulate the pharyngeal sound [ʕ] instead of the glottal stop [ʔ]. For instance, it is commonly heard in this dialect that /ʕant/ for (أنت) “you”, /ʕaalah/ for (آلة) “machine”, /soʕaal/ for (سؤال) “question” whereas in Classical Arabic or MSA they are pronounced as [ʔant], [ʔalah] and [soʔaal] with the glottal stop (Al-Matlabi, 1987). Searching for a phonological analyzing to this mutation, Anees (1992) suggested that this consonant mutation occurs as a result of articulating the glottal stop with an exaggerating fashion (a greater force of articulation). This exceeding force will cause the place of articulation of the glottal stop to move to the place of any other sound which is the nearest to it. The resultant sound in this case is [ʕ] (Ayn).

Second mutation case

A careful listener to the speech of some tribes in the west of the Arabian Peninsula will notice that their speakers change the pharyngeal sound [ʕ] (Ayn) to the nasal sound /n/. However, this kind of mutation occurs only with the verb /ʔaʕTa/ (أعطى) “he gave”. Accordingly, they pronounce this word as /ʔanTa/ (أنطى) instead of // ʔaʕTa / (Anees, 1992). Rabin (1951) claims that there is no mutation happened here, because [ʕ] in /ʔanTa/ is supposed to be another verb which Arabic language borrowed from Hebrew. This verb has a different meaning in contrast with the meaning of the verb /ʔaʕTa/. It corresponds to Hebrew /natah yadho ‘el/ “stretch one’s hand to” meaning “to take”.

Regressive and progressive assimilation

The Arabic word /maʕhom/ معهم “with them” is pronounced /mah h om/ by Tameem tribe. What happened is that the pharyngeal sound [ʕ] (Ayn), which is a voiced consonant, comes into contact with the glottal sound [h] which is voiceless consonant. In this case, the pharyngeal sound [ʕ] (Ayn) became voiceless sound as a natural influence of the voiceless sound [h] and then that leads to changing [ʕ] (Ayn) into a voiceless pharyngeal sound which is [ħ]. However, the regressive assimilation in this word leads also to having a progressive assimilation when the

glottal sound [h] merged into the pharyngeal sound [ħ]. It should be noted that this type of assimilation rarely occurs in Arabic (Aness, 1992).

CONCLUDING REMARKS

The paper has attempted to examine the effect of pharyngeal sounds in terms of changing the word structure on two linguistic levels of analysis, i.e., morphological and phonological. The paper scope is confined to some Bedouin dialects of the Arabian Peninsula. After providing a brief account on some descriptive studies done on pharyngeal sounds by both early and modern Arab phonologists, the paper has investigated the effect of pharyngeal sounds in Arabic Bedouin dialects of the Arabian Peninsula in two different linguistic aspects, i.e., changing syllable structure and certain changes affecting the morphology and phonology of these dialects.

In the first aspect, it was indicated that pharyngeal segments favor to occupy syllable initial rather than medial or final. Moreover, the phonological phenomenon known as the “*gahawa* syndrome” has been examined to support the view that pharyngeal consonants inherently possess a higher degree of coarticulation with low back vowels.

Regarding the second aspect, there were certain morphological modifications influenced word structure in both verb and noun forms of these dialects. We considered these changes as a result of the application of specific morphological rules due to the presence of a pharyngeal sound in the word. As for the phonological changes, there was a noticeable effect reflected as certain phonological processes acted on which led to changes in the phonetic environment that caused by the presence of a pharyngeal sound. Some of the examples which illustrate such phonological processes are deletion, mutation, and assimilation. The paper could shed some light on the nature of these phonological rules and suggested some anthropological linguistic interpretations for some of these phenomena.

Notes

1. Sibawayhi might be the “first Arab linguist to use the term *Mukhraj* to mean a place of articulation whereas, Farahidi (the teacher of Sibawayhi) used the term of *Mudraj* which means the place of movement and *Hayyiz* which means space” (Al-Nassir 1993:14).
2. Sibawayhi defines *Majhur* as “a letter fully supported in its place and the flow of breath is impeded until the support is completed and the sound flows on” while Mahmus is “a letter weakly supported in its place and the breath is allowed to flow with it” (Sibawayhi 1977: 4/ 434, the translation is taken from Al-Nassir 1993:35).
3. The Phonetics Laboratory of King Saud University (Riyadh) is one of the leading laboratories in the Middle East.
4. The IPA chart classifies [ʕ] as a voiced pharyngeal fricative.
5. The Arabian Peninsula, taken to include Saudi Arabia, Yemen, Oman, the United Arab Emirates, Bahrain, Qatar and Kuwait, has an area of circa 3 million square kilometers and an estimated population (2000 figures, HG) of 47,890,000 (see 2011).

6. Bedouin tribes are the inhabitant of the desert.
7. We prefer to consider this change as an independent aspect (not as a part of phonological change) because this phenomenon greatly occurs in these dialects. It is known as the “gahawa syndrome” as will be illustrated in the course of this section.
8. Arabic words consist of root phonemes and redundant phonemes.
9. Arabic has three short vowels: the commonest short vowel-sign is called *fatha*. It is a small stroke above the consonant. For example, “ب b” followed by *fatha* is written بَ. *Fatha* is usually transliterated by the English [a]. The second short vowel-sign is called *Kasra* which is stroke below the consonant. For instance, “ب b” followed by *Kasra* is written بِ. It represents the sound of [i] in */sit/*. The third vowel-sign is called *domma*, and is a comma like mark above the consonant which it follows. Thus “ب b” followed by *domma* is written بْ. It represents the sound of *u* in *put*.
10. The Hebrew language shares Arabic in this phenomenon (Matar 1967: 92).
11. We mean by Consonant mutation the positional alteration between Arabic consonant and the pharyngeal sounds.
12. This dialect is known in Arabic linguistics books by the name of “Alananah” (Anees 1992).

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APPENDICES

APPENDIX 1: A LIST OF ARABIC SOUNDS AND ITS PHONETIC SYMBOLS

<i>Arabic letters</i>	<i>The Symbols</i>	<i>Phonological Descriptions</i>
أ	ʔ	glottal plosive
ب	b	voiced bilabial stop
ت	t	voiced alveolar fricative
ث	θ	voiceless dental fricative
ج	j	voiced palatal affricate
ح	ħ	voiceless pharyngeal fricative
خ	x	voiceless uvular fricative
د	d	voiced alveolar stop
ذ	ð	voiced dental fricative
ر	r	voiced alveolar flap
ز	z	voiced alveolar fricative
س	s	voiceless alveolar fricative
ش	ʃ	voiceless palato-alveolar fricative
ص	S	emphatic s
ض	Ḍ	voiced velarized alveolar stop
ط	T	emphatic t
ظ	Ḍ	voiced velarized dental fricative
ع	ʕ	voiced pharyngeal fricative
غ	gh	voiced uvular fricative
ف	f	voiceless labiodental fricative
ق	q	velar glottalized plosive
ك	k	voiceless velar stop
ل	l	voiced alveolar lateral
م	m	voiced bilabial nasal
ن	n	voiced alveolar nasal
هـ	h	voiceless glottal fricative
و	w	voiced bilabial semi vowel
ي	y	voiced palatal semi vowel

Vowels			
Vowel	Short		Long
Central open		a	aa
Front closed		i	ii
Back closed rounded		u	uu

Table 2. The twenty-nine “original letters of Arabic, listed with its Phonological Descriptions

APPENDIX 2: DATA COLLECTION

<i>Original word</i>	<i>Modified word after rule</i>	<i>English gloss</i>
/ghwah/	/ghawh/	“coffee”
/nçgah/	/nçagah/	“sheep”
/nh lah/	/nah lah/	“bee”
/bGlah/	/bGalah/	“mule”
/mh room/	/mh aroom/	“deprived of”
/lh mah/	/lh amah/	“meat”
/zçtar/	/zçatar/	“thyme”

TABLE 3: LIST OF ARABIC WORDS REPORTED IN THE PRESENT STUDY AND THEIR ENGLISH GLOSS FOR SYLLABLE STRUCTURE CHANGES.

(A)

<i>Original word</i>	<i>Modified word after rule</i>	<i>English gloss</i>
/yaDhabo/	/yaDhabo/	“to go”
/yarh alo/	/yarh alu/	“depart”
/yamrah u/	/yamrah u/	“play”
/yaqtaçu/	/yaqtaçu/	“to cut”
/yArh amo/	/yrhamu/	“pity”
/ysmaçu/	/yasmau/	“hear”
/yaqmaço/	/yakmaçu/	“tame”

TABLE 4: LIST OF ARABIC WORDS REPORTED IN THE PRESENT STUDY AND THEIR ENGLISH GLOSS FOR THE MORPHOLOGICAL CHANGE.

(B)

<i>Original word</i>	<i>Modified word after rule</i>	<i>English gloss</i>
/shaçiir/	/shiçiir/	“barley”
/baçiir/	/biçiier/	“camel”
/h ariim/	/`ireem/	“women”
/saçeed/	/siçiied/	“happy”
/nah iif/	/ni,eef/	“thin”
/laçb/	/liçb/	“playing”
/Ďah k/	/Ďih k/	“laughing”

TABLE 5: LIST OF ARABIC WORDS REPORTED IN THE PRESENT STUDY AND THEIR ENGLISH GLOSS FOR THE PHONOLOGICAL CHANGE.

(A)

<i>Original word</i>	<i>Modified word after rule</i>	<i>English gloss</i>
/ṛaçma/	/çmal/	“blind”
/ṛah mar/	/h amr/	“red”
/ṛaçmaam/	/çmam/	“uncles”
/ṛah wal/	/h awal/	“cross eyes”
/ṛaçwar/	/çwar/	“one eyed”
/ṛaçmaal/	/çamal/	“assignment”

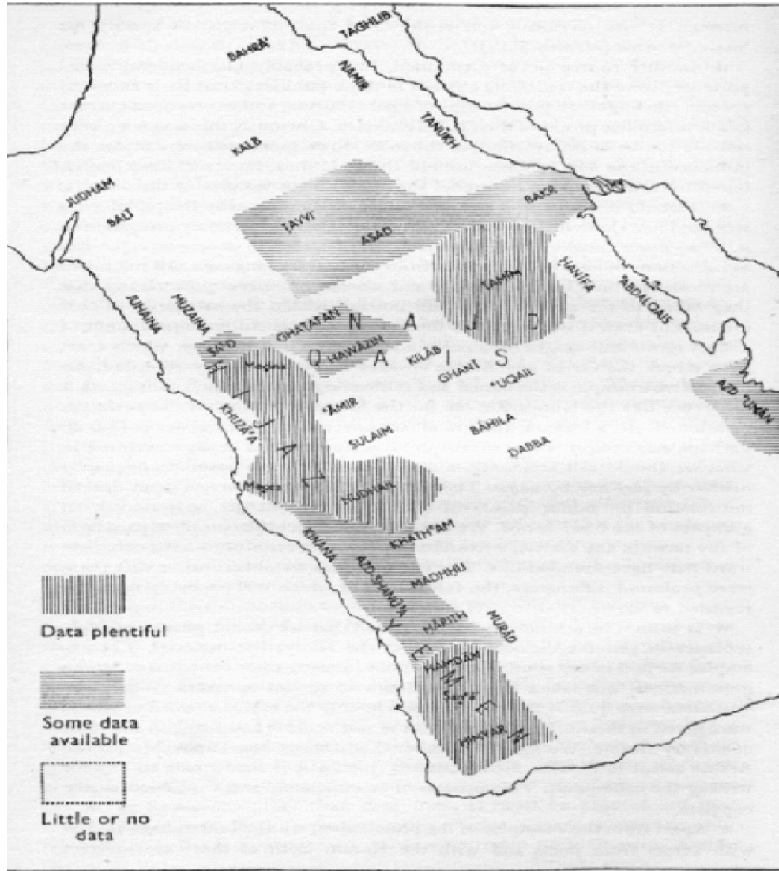
(B)

<i>Original word</i>	<i>Modified word after rule</i>	<i>English gloss</i>
/ʔanta/	/ʃant/	“you”
/ʔaalah/	/ʃaalah/	“machine”
/suʔaal/	/soʃaal/	“question”
/hayʔah/	/haiʃah/	“committee”
/ʔalʔimaam/	/alʃmam/	“imam”
/ʔʔTaa/	/ʔnTaa/	“gave”
/maʃahom/	/mh h om/	“with them”

TABLE 6: LIST OF ARABIC WORDS REPORTED IN THE PRESENT STUDY AND THEIR ENGLISH GLOSS FOR THE PHONOLOGICAL CHANGE.

Appendix 3: Maps of S Arabian Peninsula

1. Map of the distribution of Bedouin Arabic tribes in the Arabian Peninsula (after Rabin, 1951):



2. Map of Arabic Gulf region showing the location of the Arabian Peninsula:

