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Contents

About the authors

Dr James Dickins is Lecturer in Arabic Language and Course Director of the Diploma in Arabic at the Centre for Middle Eastern and Islamic Studies, University of Durham. He is well known for his research on Sudanese Arabic, for developing Arabic language courses and for teaching and supervision of Arabic-English translation and translation theory. He is currently writing a book on a semiotic approach to linguistic analysis and is working with Dr Watson on an *Advanced Arabic Language Course,* also for publication.

Dr Barry Heselwood is Lecturer in Phonetics and Linguistics in the School of Applied Social Sciences, Leeds Metropolitan University, where he contributes to the education and training of speech and language therapists. His recent publications include studies of speakers with phonetic and phonological disorders and a paper on axiomatic functionalist linguistics. He spent two years lecturing in linguistics at Omdurman Islamic University, Sudan, and has an abiding interest in Arabic phonology.

Dr Janet C.E. Watson is Lecturer in Arabic Language at the Centre for Middle Eastern and Islamic Studies, University of Durham. A specialist in Yemeni dialects of Arabic, she is the author of *A Syntax of San'ani Arabic* and *Sbahtu! A Course in Ṣanʿānī Arabic* and has one other book forthcoming on Arabic horse terminology. She is currently researching the phonology of modern spoken Arabic and is working on an *Advanced Arabic Language Course* with Dr Dickins.

INTRODUCTION.

This volume is the first in the *CMEIS Occasional Papers Series* to be devoted to Arabic linguistics. As the title of the volume indicates, all three papers included are concerned with aspects of Arabic phonology. Within this, there are further areas of commonality linking the papers in various ways.

All three papers are presented in such a way that they are maximally accessible to the reader with a general knowledge of Arabic and theoretical linguistics, and it is intended that the papers should be of relevance to Arabists and linguists whatever their theoretical orientation. At the same time, each of the papers is grounded in a particular linguistic theory. Watson's paper assumes a generative-phonological approach, and is specifically based on an amalgam of feature geometry and non-concatenative morphology, which she developed in her doctoral thesis, *Aspects of the phonology and morphology of three Yemeni dialects*. Heselwood's and Dickins' papers are based on the structuralist theory of extended axiomatic functionalism first proposed by MAL Lamb and explicated in Heselwood's doctoral thesis, *Extended axiomatic-functionalist phonology: an exposition with application to aspects of Arabic*, and Dickins' forthcoming book, *Extended axiomatic linguistics*.

Watson's and Heselwood's papers share the common theme of emphasis and its phonetic correlates. Watson explores this issue with respect to San'ani Arabic, concluding her paper with a consideration of the implications of her analysis for universal distinctive-feature theory. Heselwood's paper reflects the structuralist nature of extended axiomatic functionalism. The paper has a diachronic dimension, but focuses synchronically on the interrelationship between the structural status of emphasis in two modern dialects - Baghdadi and Cairene - and the differing phonetic correlates of the emphatic phoneme /ṭ/ in these dialects. The theme of the interrelationship between structural potential and the actualisation of this potential in speech is also taken up by Dickins in the concluding section to his paper, where he considers the occurrence (or otherwise) of the vowel combinations /iu/iw/ and /ui/uy/ in Sudanese and Classical Arabic. The overall theme of Dickins' paper is the structural potential of the Classical Arabic vowel system, and the possibility that certain standardly non-permissible vowel combinations might be invoked to explain various phenomena described by Sibawayh in his Kitab.

JAMES DICKINS

5

SOME SPECULATIONS ON THE VOWEL SYSTEM OF CLASSICAL ARABIC.

James Dickins: Centre for Middle Eastern and Islamic Studies, University of Durham.

0. Introduction.

In this paper I consider the vowel combinations of Classical Arabic. I discuss the possibility that vowel combinations which are not considered to have been standardly permitted in Classical Arabic might have occurred in certain ancient dialects. I draw mainly on the observations of Sibawayh, as well as more modern interpretors of the classical Arabic grammarians such as Rabin (1951) and al-Nassir (1993). Given the nature of the material which I am looking at and the relative brevity of this paper, the arguments which I present here are not intended to be anything more than speculative and exploratory.

1. The Classical Arabic vowel system.

Classical Arabic has three vowels /a/, /u/, and /i/, and allows for combinations of two vowels. These may be either two identical vowels, yielding a long vowel, or two different vowels, yielding a diphthong The potential for combinations of two vowels in Classical Arabic suggests that in principle it should be possible to have nine two-vowel combinations, i.e. 3x3 vowels. As is shown in Fig. 1, in practice it appears that only five of the nine two-vowel combinations occur.

Fig. 1

2nd vowel →	/a/	/u/	/i/
1st vowel ↓ /a/	/aa/ اَ.. e.g. حَال	/au/aw/ وْ.. e.g. نَوْم	/ai/ay/ يْ.. e.g. بَيْت
/u/	*/ua/ اَ.. *	/uu/uw/ وُ.. e.g. طُول	*/ui/uy/ يُ.. *
/i/	*/ia/ اَ.. *	*/iu/iw/ وُ.. *	/ii/iy/ يِ.. e.g. فِيل

As Fig. 1 suggests, |u| and |w| are to be regarded as variants - i.e. allophones - of a single phoneme, this phoneme being representable as either /u/ or /w/. Similarly, I believe |i| and |y| are to be regarded as variants - allophones - of a single phoneme, this phoneme being representable as either /i/ or /y/. This analysis is in line with the Arabic writing system which represents the vowel |u| by *damma*, which is a small *waaw*, and represents the vowel |i| by *kasra*, which is a small *yaa'*. It also accords with the fact that neither |u| and |w|, nor |i| and |y| directly contrast with one another in the same context, and with the fact that there are contexts where it seems arbitrary whether one regards the sound in question as |u| or |w| (e.g. *naum/nawm* "sleep") or as |i| or |y| (e.g. *bait/bayt* "house"). Of the three Arabic "vowels" therefore /a/, /u/, and /i/, both /u/ and /i/ have consonantal as well as vocalic realisations, while /a/ has only vocalic realisation[1].

2. Non-standard vowel combinations in Classical Arabic.

As Fig. 1 shows, the combinations /aa/ (اَ..), /au/aw/ (وْ..), /ai/ay/ (يْ..), /uu/uw/ (وُ..), and /ii/iy/ (..) are standard and accepted features of Classical Arabic, while the starred combinations */ua/ (اَ.. *), */ia/ (اَ.. *), */iu/iw/ (وُ.. *), and */ui/uy/ (يُ.. *) are regarded as unacceptable. In the following, I want to consider each of these apparently unacceptable

7

combinations in more detail. I will take the combinations in the order in which I have just listed them. In general, I believe this order takes us from the most controversial non-standard potential vowel combination (/ua/) to the least so (/ui/uy/).

2.1 'Alif al-tafxiim and the vowel combination ua (/..).

In the Kitab, Sibawayh discusses a number of non-standard pronunciations of vowels. According to Al-Nassir (1993: 91-95, 97-103), many of these are to be regarded as contextual variants. That is to say, they are particular pronunciations (realisations) of the vowel when it occurs in the context of other specifiable phonemes. An example is the 'imaala, i.e. phonetically speaking the fronting and raising, of /a/ when it occurs in the context of a /i/\/y/. Thus the /aa/ combination in the word, ᶜaabid "worshipper" seems to have been pronounced something like [e:] due to its occurrence in the context of the following /i/; i.e. this form was pronounced something like [ᶜe:bid] (Sibawayh, 1982: 117; cf. al-Nassir, 1993: 93) (cf. also Section 2.2). This kind of phenomenon does not pose any challenge to the traditional analysis of Arabic phonology. The pronunciation of /aa/ as [e:] is purely a function of the context in which it occurs. Crucially, it does not contrast in this context with a sound /a:/ (or similar) which might be the pronunciation of a different word. Accordingly, [e:] here can simply be regarded as an allophone of /aa/. Since [e:] is an allophone whose occurrence is determined by the its being in the context of /i/, it is what is known as a contextually determined allophone of /aa/. This is analogous to the way that I have argued above (Section 1) that [u] and [w] can be regarded as allophones of single phoneme /u//w/, and [i] and [y] can be regarded as allophones of single phoneme /i/y/.

I turn now to the question of 'alif al-tafxiim. Sibawayh says that 'alif al-tafxiim is a variant of 'alif (يَعني بلغة اهل الحجازَ في قولهم الصلاة والزكاة والحياة) (Sibawayh, 1982: 432; cf. al-Nassir, 1993: 103). Rabin suggests that "the accounts of the tajwiid works leave no doubt that the final syllable of these words was pronounced as an o, not as aa" (Rabin, 1951: 106), while al-Nassir argues that the pronunciation was probably "somewhere between the cardinal vowels Number 6 ɔ and Number 7 "o"" (al-Nassir, 1993: 103). Rabin assumes that what was involved in this pronunciation was simply a "position-variety of the a-phoneme (namely, stressed and final) in which it sounded more u-like than in any other position" (Rabin, 1951: 106). That is to say, for Rabin, the 'alif al-tafxiim was merely to be regarded as a "position-variant", i.e. a contextually determined allophone of /aa/, an analysis which is adopted by al-Nassir (1993: 103). This is the obvious interpretation of the remarks

8

about 'alif al-tafxiim made by Sibawayh himself, where it is listed as one of the "secondary" letters (فروع), "which are widely used and approved in the reading of the Quran and poetry" (وهي كثيرة يُؤخذ بها وتُستحسن في قراءة القرآن والاشعار Sibawayh, 1982: 432).

This analysis may be correct; i.e. it may simply be the case that /aa/ in this context in the Hijazi dialect was realised as [ɔ]/[o]. Rabin supports his argument by noting a spelling peculiarity of words containing 'alif al-tafxiim, namely that in the Quran 'alif al-tafxiim "was indicated in old codices by writing waaw instead of 'alif" (Rabin, 1951: 105). He also notes that, "The list of nouns thus spelled includes all nouns with a before the feminine ending found in the Koran: ṣalāh 'prayer', ḥayāh 'life', zakāh 'alms', najāh 'deliverance', ghadāh 'morning', mishkāh 'lamp-niche', manāh 'the goddess Manat'. To these must be added ar-ribā (written الربوا) 'usury'" (ibid): i.e. ṣalaa, for instance, was written صلوة. Rabin concludes, "There is no reason to think that other words of the same time [type?], such as ghazāh, rajāh, would have been treated differently had they occurred in the Koran" (ibid: 106). He also points out that the waaw in words which display 'alif al-tafxiim disappears before pronoun suffixes (ibid.).

It may be that all nouns of this type were pronounced with 'alif al-tafxiim in Hijazi dialect. However, this does not by itself demonstrate that the phenomenon was allophonic. Nor does the fact that this 'alif al-tafxiim disappeared when pronoun suffixes were added indicate that 'alif al-tafxiim was allophonic. One need only consider the preposition ^{c}ala in Standard Arabic, which takes the form ^{c}alai- before pronoun suffixes (^{c}alai-kum "on you [m.pl.]", etc.)

Let us suppose for the moment, along with Rabin, that "Since Arabic words are spelled as in absolute pause, where the t [of the taa' marbuuṭa] disappeared, the vowel indicated by w was final and stressed" (ibid: 105), i.e. in the case of صلاة/صلوة, for example, one had a pronunciation along the lines [ṣalóː]. It might appear that there should be a contrast between this and the pronunciation of صَلَى "he roasted/fried", which would presumably be something like [ṣalaː]. Unfortunately, this contrast would appear to have been invalid in Hijazi Arabic, where a form such as صَلَى, with an i-imperfect, seems to have been pronounced [ṣalai] (ibid: 161). One would need to opt for a verb such as غلا (imperfect يغلو) "to exceed the proper bounds", or بلا (imperfect يبلو) "to put to the test" to provide an imperfect (but still acceptable) contrastive pair with صلاة in Hijazi dialect, since in this dialect it was only such u-imperfect verbs which were pronounced with final "a". If the pair صلاة/ غلا ([ṣalóː]/[ġalaː]) provided a valid contrast in their final vowels, it would have to be concluded that 'alif al-taf.ii was phonologically opposed to the normal 'alif.

9

Unfortunately, there are additional complications associated with this counter-proposal. It might, for instance, be the case that غلا and بـلا were differently stressed from صلاة, with the stress on the final syllable in صلاة and on the first syllable in غلا and بـلا, as in Modern Standard Arabic (cf. ibid: 102-104 for a discussion of stress in ancient Hijazi Arabic). In this case the proposed demonstration of opposition between *'alif al-tafxiim* and |a:| would not stand, or it would at least be considerably undermined. One would thus be forced back to a comparison between صلاة and other correspondents such as كلا |kala:| "|indeed| no", or فلا |fala:| "and so ... not", where the pronunciation of Modern Standard Arabic suggests that the stress would have been the same as that of *salat*.

Another potential problem with the proposed counter-analysis is that it might be that Rabin's assumption that the *taa' marbuuṭa* was at this stage phonologically irrelevant in pause is incorrect. It may be, as Fischer has argued (Fischer, 1956: 36), that forms with *taa' marbuuṭa* were at this early stage pronounced with a final [h]. In this case the pronunciation of صلاة in pause would be have been something like |sɑlo:h|. This would obviously render a proposed contrast with بـلا/غلا or even كلا/فلا invalid. There are, however, other forms which one might reasonably contrast with the proposed pronunciation of صلاة as |sɑlo:h| in pause. A near-minimal pair would seem to be established, by صلاة |sɑlo:h| vs. بلاه |bala:h| 'he put him/it to the test', where this latter word is pronounced in its pause form. It would seem difficult not to accept this as a valid contrast (opposition); and if it is a valid contrast, one would have to conclude that *'alif al-tafxiim* is phonologically different from (opposed to) the normal *'alif* |a:|.

If *'alif al-tafxiim* was phonologically different from the normal *'alif* at this stage, and assuming this "normal *'alif*" to be merely a combination of the two /a/-vowels, what could *'alif al-tafxiim* be phonologically? Rabin suggests that the obvious alternative possibility would be to recognise an additional /ȯ/ phoneme (ibid: 106) (as has been seen above, he rejects this possibility). This solution would be messy, partly because this phoneme would only occur in very restricted circumstances, and partly because it would only apparently occur in a long variant (there would be no short /o/, as there are short /a/, /u/, /i/, as well as long /aa/, /uu/, /ii/). Most importantly, however, such a move is to be avoided if possible, because it would involve making the description of ancient Hijazi Arabic more complex by introducing an additional phoneme. If a reasonable solution could be found making use of only existing phonemes, such a solution would necessarily be preferred.

A possible solution, and one which fits in fairly well with the spelling of صلاة etc. as صلوة etc. in old codices, would be to regard the *'alif al-tafxiim* as the standardly non-permissible vowel combination /ua/ (اُ) given in Fig. 1. This analysis would suggest that

the script form صلوة is an attempt to mark the "u"-vowel, which was presumably made at a time before the development of *damma*. The analysis implies that *'alif al-tafxiim* could be written as ‍ٔ.., i.e. that صلاة in Hijazi Arabic could have been written as صَلٰوة.

Phonetically, this proposal seems reasonable. The monothong [ɔ], in particular, is roughly half-way between |u| and |a|/|ɑ|, and this might have been the "averaged" pronunciation of some form of diphthong starting at |u| and ending at |a|/|ɑ|.

It is also worth considering the term *tafxiim* in a little more detail. Al-Nassir remarks that apart from the *'alif al-tafxiim*, "No other segment is described by Sibawayh to be mufakham" (al-Nassir, 1993: 103). Another, apparently early use of the term *mufaxxam*, however, is to describe the 'l'-sound which occurred in *allaah* (Gairdner, [1978]: 197). This appears to have been a dark 'l', i.e. a velarised [ɫ], as opposed to the light 'l', i.e. the non-velarised [l], which was normal for Classical Arabic. The [ɫ] of *allaah* is probably not to be regarded as a proper phoneme in Classical Arabic. It is certainly possible to find a minimal pair by which this [ɫ] is differentiated from [l]: Ferguson cites *wallaahu* "and God" vs. *wallaahu* "and he appointed him [governor]" (Ferguson, 1978 : 158). However, the [ɫ] apparently only occurs in *allaah* 'God' and related forms; it is thus not part of the regular, i.e. recurrent, features of the phonology of Classical Arabic, and is therefore properly extra-systematic (Dickins, forthcoming: Chapter Four; but cf. also Heselwood, 1992: 153-156).

More importantly from the current point of view, however, is that while pharyngealisation appears to be the standard phonetic correlate (i.e. realisation) of emphasis in the modern Arabic dialects (e.g. Al-Ani, 1970: 44; Laver, 1994: 327), in Classical Arabic there is good reason to think that the standard phonetic correlate of emphasis in Classical Arabic was velarisation and/or uvularisation. Thus, Sibawayh terms the emphatic phonemes of Classical Arabic - i.e. /t/ ط, /ð/ ظ, /d/ ض, and /s/ ص - *muṭbaq* "lidded", while all the other other phonemes are described as *munfatiḥ* "open" (Sibawayh, 1982: 436; cf. al-Nassir, 1993: 50). Sibawayh, however, also describes the four "lidded" letters, plus the velars /q/ ق, /ġ/ غ, and /x/ خ, as *mustaᶜlī*, or "high" (Sibawayh, 1982: 129; cf. al-Nassir, 1993: 51). The "highness" of these sounds was a matter of their being مستعلية الى الحنك الاعلى "raised to the upper palate"; that is to say, all the *mustaᶜlī* letters were "velaric" or "uvularic". In the case of /q/ ق, /ġ/ غ, and /x/ خ, this velaricness or uvularicness was a case of their primary articulation, i.e. these sounds were velars or uvulars. In the case of the *muṭbaq* letters, this velaricness or uvularicness was a case of their secondary articulation, i.e. these sounds were velarised or uvularised.

If emphasis in Classical Arabic was achieved through velarisation or uvularisation, and if the *mufaxxam* 'l' of *allaah* was velarised, it seems plausible that the *tafxiim* of the *'alif*

11

al-tafxiim also involved some velar feature (as noted in Section 1). The phoneme /u/w/ is a velar. The suggestion that *'alif al-tafxiim* involved the vowel combination /ua/ $l_{..}$ thus appears consistent with the overall phonetics of emphasis and wider uses of the term *tafxiim* with respect to the phonetics and phonology of Classical Arabic. Watson has noted the close association between [u] and emphasis in San'ani Arabic, such that, "verbs of the pattern *fu^{c}ul* normally have an emphatic consonant or a velar consonant in the root" (Watson, this volume: 45), e.g. *ṭulu^c* "he went up", *ḍuḥuk* "he laughed", *^{c}uṭus* 'he got thirsty', *muṭur* "it rained". It has also been proposed by Heselwood that /w/ in modern standard Arabic be regarded as the emphatic counterpart of /y/ (Heselwood, 1992: 162-163).

2.2 The vowel combination *ia* ($l_{..}$).

Of specific interest in considering the possibility that ancient Arabic allowed an /ia/ $l_{..}$ vowel combination is the phenomenon of *'imaala*. By *'imaala* is meant the "deflecting" of an *a*-vowel, specifically in the direction of *i* or *y* .

It seems clear that most of the phenomena described in Sibawayh as *'imaala* are cases of contextually determined allophony. As noted earlier (Section 2.1), Sibawayh, for example, describes the pronunciation of *^{c}aabid* "worshpper" as [^{c}e:bid] or similar (Sibawayh, 1982: 117; cf. Nassir, 1993: 93), where the [e:] vowel is purely the result of the realisation of the /aa/ phoneme sequence in the context of /i/, and where there seems to have been no question of a contrast between two forms [^{c}a:bid] and [^{c}e:bid]. There are, however, two phenomena, which do not appear to admit of an explanation in terms of contextually determined allophony in this way.

The first involves forms such as *^{c}ašä* "supper" (given in Sibawayh as عشا), and *maka* "pit of an iguana" (given in Sibawayh as مكا), where Sibawayh describes the final 'a' as being pronounced with *'imaala* (Sibawayh, 1982: 119). Al-Nassir suggests pronunciations [^{c}aše:] and [make:] respectively (al-Nassir, 1993: 96). Sibawayh links the obligatoriness of the pronunciation with *'imaala* to the fact that these words have a final root letter *yaa'*, they are من بنات الياء (Sibawayh, 1982: 119, 120). He also contrasts this with the optionality of *'imaala* (... وقد يتركون الامالة) in cases such as *^{c}aya* عصا "stick", where the final root letter is *waaw* (ibid: 120). If this analysis is correct, it implies that the *'imaala* was not in these word-final cases purely determined by context, and that it would in principle be possible to find a minimal pair on the lines عشا [^{c}aše:] vs. عصا [^{c}aṣa], where the former did not admit of a non-velarised variant (cf. English "dual" and "jewel" which are

12

perhaps typically pronounced identically, but where only the former admits of a realisation with initial [d]).

The second phenomenon is even more striking than the first. Sibawayh mentions a number of verbs which were pronounced with 'imaala by the Hijazis. These include xaaf "he feared", taab "he got better", and haab "he dreaded" (Sibawayh, 1982: 121; cf. al-Nassir, 1993: 96). On the basis of internal evidence from Sibawayh, Rabin argues that "In the Hijaz there was no 'imaala in any case" (Rabin, 1951: 111) of the normal contextually determined kind. That is to say, the 'imaala which Sibawayh describes in these verbs could not have been a case of contextually determined allophony. This impression is confirmed by the fact that the only verbs which have this kind of 'imaala are those whose medial radical is yaa' , or which exhibit a kasra in the first person singular and other forms of the perfect; standard verbs with a medial radical waaw such as qaam "he got up" and daar "he [/it] turned" do not exhibit 'imaala (Sibawayh, 1982: 121). To reinforce the point, Sibawayh notes that some Hijazi speakers pronounce the word maat "he died" with 'imaala; the only people to do so, however, are those who also say mittu "I died" وقـالوا مـات وهم الذيـن يقـولون مِتُ "I died" mittu (ibid.).

If this 'imaala was not contextually determined allophony, what was it? Rabin argues that Hijazi Arabic, in addition to the phonemes /a/, /i/, and /u/ (and the standard combinations resulting from these, as tabulated in Fig. 1), also had a long /ë/ phoneme, which he considers to derive from a rather controversial reconstructed proto-Semitic /ë/ (Rabin, 1951: 110-114, 121; cf. Moscati et al, 1964: 46-47 for the doubtful nature of such a phoneme in proto-Semitic). This /ë/ was thus attested in xaab, taab, haab, etc. Rabin's solution is clearly a possibility. It is, however, messy, since it posits a long-vowel phoneme, which unlike all the other long vowels has no short correspondent (cf. the discussion in Section 2.1 on a possible ancient Arabic /o:/ phoneme). If a simpler and equally adequate solution is forthcoming, therefore, Rabin's proposal is to be rejected. The alternative which I am suggesting here is that the vowel in cases of the xaab, taab, haab type was the /ia/ combination. That is to say, in   cases of the xaab, taab, haab type, and possibly also in cases of the ᶜaša, maka type, the deflection - 'imaala - of the 'alif is a consequence of the preceding 'i' vowel. Interestingly, Rabin notes irregular spellings of some of the relevant forms, for instance, reportedly طيب for طاب in Othman's model codex (Rabin, 1951: 112). Such spellings parallel spellings of the type صلوة, which I have argued may have involved an /ua/ vowel combination. One can only guess at the precise phonetic realisation of the proposed vowel combination /ia/, but perhaps it was a diphthong starting at [i] and ending at [a], with an "averaged" pronunciation around [e:].

13

2.3 The vowel combination *iu/iw* (ِو).

As far as I am aware there are no modern dialects of Arabic which exhibit the vowel combinations /ua/ or /ia/, and this certainly casts some doubt on the likelihood of these combinations existing in Classical Arabic. The vowel combinations /iu/iw/ and /ui/uy/, by contrast are certainly to be found in at least some modern dialects. Thus Sudanese Arabic has /iu/iw/ (ِو) in forms such as *siwsiyw* سِوْسِيو "chick". Other examples suggested to me by an informant are *tihiwhiw* تِهِوْهِو "barking" (a verbal noun from *ho:ho:* "to bark"), and *biwzin* بِوْزِن "he weighs" (imperfect of *wazan* "to weigh" with the *bi-* prefix; the forms *bo:zin* and *bawzin* are also found). This suggests a certain general plausibility for the presence of a /iu/iw/ combination in Classical Arabic.

As with the possible vowel combination /ia/, *'imaala* is of particular relevance in considering a possible vowel combination /iu/iw/ in Classical Arabic, in this case case *'imaala* in the context of /u/w/. As with other cases of *'imaala*, most cases of *'imaala* in the context of /u/w/ in Classical Arabic seem to be examples of contextually determined allophony. Thus مَذعور "scared" (Sibawayh, 1982: 143) for which al-Nassir suggests the realisation [maðcɱ:rin] (al-Nassir, 1993: 102). In this case, the *'imaala* is due to the presence of the final case-ending *-in*.

There is, however, at least one example given by Sibawayh which is not so easily explicable. This is the form رُدّ "was given back" (the passive of رَدّ, which appears in Sibawayh as رُدّ (Sibawayh, 1982: 118) and for which al-Nassir suggests the phonetic form [rɱdda] (al-Nassir, 1993: 102). Sibawayh attributes this to the fact that رد is من بنات الياء (Sibawayh, 1982: 118). Al-Nassir translates this into the modern linguistic conception of "an underlying kasra" (al-Nassir, 1993: 102). I take it that Sibawayh is referring to the fact that sound verbs in the perfect passive have the pattern *fuᶜila*, i.e. there is a medial "i", and that the pronunciation of رد here reflects this. If this is the case, it would appear that [rɱdda] here would be contrastable with a form such as رِدّة "apostasy". It would also be contrastable with a form such as رُدّة, which although it does not exist as a word, is perfectly reasonable as an Arabic phonological form (and whose absence is therefore to be regarded phonologically as a so-called accidental gap). Other near-contrastive forms such as مُدّة can in any case be reasonably substituted to support the potential phonological opposition. I also assume here that the realisation of *taa' marbuuta* in pause was in fact [a], rather than [ah] (cf. Section 2.1).

14

is سَيْطِر, and gives the example كيف سَيْطِر عليهم "How did they come to be dominated?" (Abboud et al., 1983: 11).

Forms such as "rüyya" involve what is termed by Sibawayh and others 'išmaam, or yaa' bi-'išmaam aḍ-ḍamma (Rabin, 1951: 119), which is taken to have the phonetic value [ü] by modern writers on the subject, e.g. Rabin (ibid.), Gairdner ([1978]: 194). As an example of 'išmaam, Gairdner quotes the form [qüla] as a realisation of قيل "was said", the passive of قال (Gairdner, [1978]: 194-195; Howell, 1883: 1479). Rabin, citing the Lisān Al-ᶜarab, also notes qüla for qiila and other similar passive forms of hollow verbs with a medial yaa' root letter (Rabin, 1951: 159). As in other cases, the obvious explanation for this form is that it involved an /ui/uy/ vowel combination, i.e. that it was /quila/ (or /quyla/) قُيْلَ.

3. Conclusion.

I have suggested that all the standardly non-permitted vowel-combinations outlined in Fig. 1, may have occurred in ancient dialects of Arabic, even if none of them occurred in all dialects. Fig. 2. gives examples of forms which I have discussed in this paper, and which may have exhibited the standardly non-permitted vowel combinations, as well as examples of forms exhibiting the standardly permitted vowel combinations already given in Fig. 1.

Fig. 2

2nd vowel →	/a/	/u/	/i/
1st vowel ↓ /a/	/aa/ ا.. e.g. حَال	/au/aw/ و.. e.g. نَوْم	/ai/ay/ ي.. e.g. بَيْت
/u/	/ua/ ا.. e.g. صلاةُ	/uu/uw/ و.. e.g. طُول	/ui/uy/ ي.. e.g. قُيْلَ
/i/	/ia/ ا.. e.g. خَاف	/iu/iw/ و.. e.g. رِوْدَ	/ii/iy/ ي.. e.g. فِيل

16

I noted at the beginning of this paper that what I have to say here is largely speculative - and given that the dialects which I have discussed are no longer extant it will no doubt remain so. I believe, however, that there is value in offering reinterpretations of traditional analyses in the light of modern thinking, notwithstanding the speculative nature of these reinterpretations (even if we are forced to accept most of the traditional descriptions of the ancient data as recorded in classical writers). The suggestions which I have made are therefore offered in this spirit.

I have concentrated in this paper on the what might be called the "internal ecology" of the Classical Arabic vowel system. That is to say, I have considered the various combinations which the system itself suggests, as presented in Fig. 1. This is an internal linguistic matter, i.e. a matter of phonology. It is also, however, possible, and important to consider the correlates of these phonological entities in the real world, and the operation of these correlates. This is an external linguistic matter, i.e. a matter of phonetics as it applies to a particular language. One might say that all the combinations thrown up by the vowel system given in Fig. 1 are phonologically possible. It is, however, clear, that only the five standard vowel combinations occur with a high degree of frequency in Classical Arabic. Even if all the proposals which I have presented here are correct, all the other combinations are marginal; i.e they only occur in a very limited number of forms. This is also true of the combinations /iu/iw/ and /ui/uy/ in Sudanese Arabic. The motivation for this is clearly an external phonetic one. That is to say, while forms such as /aa/, /ii/, /uu/, /aw/, and /ay/ admit of articulatorily simple phonetic realisations, forms such as /ua/, /ia/, /uy/ and /iw/ do not, or at least do not do so to the same degree. It is not surprising, therefore, if these latter forms do not figure significantly in the Arabic language.

Footnotes.

1. The realisational symmetry between /u/, /i/ and /a/ would be considerably enhanced if the glottal stop /ʔ/ (corresponding to hamza ء in Arabic script) could be coherently regarded as an allophone of /a/, since this would mean that /u/, /i/ and /a/ all had consonantal as well as vocalic allophones. Such an analysis is also suggested by the Arabic tradition, where there is considerable interchangeability between the use of the terms 'alif and hamza, as well as the Arabic script, in which hamza most commonly has as its "bearer" 'alif (i.e. 'alif is written as أ or إ). Similarly, while hamza and 'alif are both counted as "letters" (حروف) by Sibawayh (1982: 431), only 'alif is traditionally counted as one of the letters of the alphabet (أبجد). Unfortunately, there are serious problems associated with an analysis of 'alif and hamza as allophones of a single phoneme, such as the presence of pairs such as بدأ 'he began/created' and بدا 'he appeared', which seem to demonstrate that the two are directly opposed to one another (both words are listed by Penrice ([1873] 1971) as occurring in the Quran). Interestingly, Watson has proposed within a generative-phonological framework that [a] and [ʔ] in Yemeni Arabic are to be be regarded as having the same phonological features (Watson, 1989: 182).

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GLOTTAL STATES AND EMPHASIS IN BAGHDADI AND CAIRENE ARABIC: SYNCHRONIC AND DIACHRONIC ASPECTS.

Barry Heselwood, Speech & Language Sciences Group, Leeds Metropolitan University.

Introduction.

The two linguistic varieties on which this study focuses are, from a synchronic point of view, independent *états de langue* and to choose to compare them is to make an arbitrary choice from amongst the many thousands of linguistic systems currently to be found across the globe. But the choice is not so arbitrary when we consider the diachronic dimension which makes it meaningful to talk of these varieties as dialects of Arabic - a term that has almost as much to do with social and cultural reality as with linguistic reality - and when we also consider that Baghdad and Cairo are important centres in contemporary Arab affairs. Nobody simply speaks 'Arabic', but all those who speak some form of Arabic share certain social, cultural and linguistic features that have a common history but which have been subject to diverse subsequent influences. Differences between these two *états* thus have a significance that could not be accorded to differences between, say, Hong Kong Cantonese and Parisian French. Although the notion of proto-languages can no longer be invoked as naively as it was at the time of the neogrammarians it nevertheless still has validity providing we recognise a proto-language as a theoretical construct (Bynon, 1977:71) with a defined role in diachronic linguistic description, i.e. as a model of historical commonality rather than as a source language from which descendant languages have all sprung (see e.g. Moscati et.al.:1969:15).

The reconstruction of historical commonality is problematic in several respects. A frustrating lack of informants necessitates the development of a specific reconstructive methodology, a methodology that cannot include hypothesising, at least not in the Popperian sense. Reconstruction is in the strange business of predicting the past and its predictions cannot be compared with the historical 'facts'. Its statements may have the form of hypotheses but they cannot have the function of hypotheses because they cannot be tested against observed phenomena. A reconstruction can therefore only be judged on grounds of plausibility, meaning that only currently well-attested phonetic processes may be postulated to account for changes that must have taken place centuries ago but which

nobody observed or recorded at the time. However, from a logical point of view, a physiologically possible but hitherto unattested process cannot be ruled out and may in fact have happened at some time in the past (and may happen again at some time in the future). Notions such as 'phonological universal' or 'markedness' have limited credibility for much the same reason (see Lass, 1980, for a critique of markedness and other explanatory notions employed to account for linguistic change). Once having arrived at a tentative reconstruction, we must resist the assumption that things actually started from there; that is to say, we must not deny a history antecedent to our reconstruction, but must consider the reconstruction as merely the most appropriate *pointe d'origine* we can find for trying to explain why things are the way they are now, and which is not contra-indicated by whatever evidence might be available, e.g. linguistic descriptions dating from earlier times.

Table 1 sets out the apical obstruents of Proto-Semitic largely as given by Cantineau (1951/1960), incorporating also the relevant conclusions of Martinet (1959). It functions as the *pointe d'origine* for explaining the different subsystems of apical obstruents in the two modern varieties of Arabic under investigation - the Muslim dialect of Baghdad, regarded as a conservative dialect (Giannini & Pettorino, 1982:21, fn.1) with Bedouin features, and the form of Arabic spoken in Cairo which is of the sedentary urban type. There are thus two separate but related dimensions involved, the diachronic and the synchronic. The reconstructive process seeks to establish the historical relationship of shared features (the extreme form of which is development from a common source) to describe how the two varieties became different, while the application of a structurally-oriented phonological theory seeks to give a synchronic dialect-specific description of the currently observable phonetic facts as they relate to the sounds in question in each variety. The two endeavours are of course methodologically quite independent, and the one does not rely on the success of the other, but nonetheless taken together they will afford us an interesting picture of phonetic change and its phonological consequences in the broader context of Arabic dialectology.

Corresponding alphabetic letter	Proto-Semitic					
1a ت	tʰ (B,C)					
1b د	d (B,C)					
1c ط	tˀ →	ʔd̪ →	d̪ →	t̪ˤ (B) → tʰˤ (C)		
2a ث	t̪θ →	θ (B) → tʰ (C)				
2b ذ	d̪ð →	ð (B) → d (C)				
2c ظ	t̪θˀ →	ʔd̪θ →	d̪θ →	ð̪ →	ðˤ (B) → d̪ˤ/zˤ (C)	
3a س	tˢ →	s (B,C)				
3b ز	dᶻ →	z (B,C)				
3c ص	tˢˀ →	sˀ →	sˤ (B,C)			
4a ش	tɬ →	ɬ →	ʃ (B,C)			
4b	dɮ					
4c ض	tɬˀ →	ʔdɮ →	dɮ →	ɮ →	ɮˤ →	ðˤ (B) dˤ (C)

TABLE I. *The probable phonetic evolution of the principal allophones of the apical obstruents from Proto-Semitic to modern Baghdadi (B) and Cairene (C) Arabic. Apart from that headed Proto-Semitic, the columns do not represent synchronic states. Where the Cairene reflex is in the column after the Baghdadi one it does not necessarily mean it is a development from it (see discussion in text).*

NB. The IPA dental diacritic [̪] and dental symbols [θ], [ð] here denote *inter*dental articulation. The other symbols denote dental or denti-alveolar articulation.
[ʰ] = aspirated; [ˉ] = unaspirated; [ˀ] = ejective; [̰] = laryngealised; [ˤ] = pharyngealised; [ɬ] = voiceless dental/denti-alveolar lateral fricative; [ɮ] = voiced dental/denti-alveolar lateral fricative.

The apical obstruents of Proto-Semitic.

Cantineau postulates four sets of triads for Proto-Semitic apical obstruents (1941/1960:16-

17; 1951/1960:281-7) each comprising one voiceless, one voiced and one emphatic (the series 1a-c to 4a-c in Table 1). He argues that of the two principal phonetic correlates of emphasis in modern Semitic languages - the ejectives of the Ethiopic branch and the pharyngealisation of the Arabic branch - it is the ejectives that represents the earlier kind with pharyngealisation being a later innovation (ibid.:291-3); however, not all scholars accept this view. Leslau is of the opinion that the Arabic type is the earlier one with the ejectives of the Ethiopic languages being a feature borrowed from the neighbouring Cushitic languages (1957:326). A brief summary of the arguments can be found in Moscati et.al. (op.cit.:23-4). Agreeing with Cantineau, Martinet has described how pharyngealisation may have evolved from ejectives (op.cit.:93-6). For labialisation as a further correlate of emphasis, see Watson (this volume).

Assuming that the emphatics in Proto-Semitic were in fact ejectives, three different glottal states, based on Laver (1980), can be identified in these triads: for voiceless consonants there are no forces of tension operating to adduct the glottis, hence it is open; in the voiced state moderate medial compression (exerted mainly by the lateral cricoarytenoid muscles and the vocalis muscle) and moderate adductive tension (exerted by the interarytenoid muscles) bring the vocal folds together closing the glottis but not sufficiently strongly to resist subglottal air pressure - voicing is then set in train by aerodynamic-myoelastic force when the subglottal air pressure overcomes the resistance; the production of ejectives involves a firmly closed glottis[1] which is brought about by medial compression and adductive tension greater than that required for the voiced state and comparable to that required for a glottal stop. The extrinsic laryngeal muscles then hoist the larynx up which compresses the air contained between it and any articulatory constriction in the supralaryngeal vocal tract. Table II sets these relationships out.

Most of the sound types given for Proto-Semitic in table I are not found in contemporary varieties of Arabic. However some, e.g. [t'] and [t͡ʃ'] occur in modern Ethiopic Semitic languages and therefore need no great justification (regarding the latter, see Steiner, (1982:87-8)). As for those that do not fall into this category, their inclusion will be more acceptable if their occurrence has been attested elsewhere. One of the more unusual sounds is the lateral ejective affricate [tɬ'] but this is attested in a number of languages and is not restricted to just one geographical area, being found in North America (Laver, 1994:370), the Caucasus and the Indian subcontinent (Catford, 1977:214). Voiced and voiceless lateral affricates are not unknown but are reported mostly for

Amerindian languages (Laver, 1994:368), voiced ones being the rarer of the two. The voiced one may in fact not have existed in Proto-Semitic (see Cantineau, 1951/1960:287). The dental affricates (2a-c) represent what Cantineau describes as "les apicales à 'pointe basse'" (i.e. the point of the tongue directed downwards) and it is unclear what phonetic value they had (Cantineau, 1952/1960:281) but they must have been distinct from the

Triad member	Degree of laryngeal tension	Glottal state
voiceless	none	open
voiced	moderate	lightly closed
ejective	strong	firmly closed

TABLE 11. *Glottal states and degrees of laryngeal tension associated with the Proto-Semitic obstruent triads.*

dental occlusives ("les apicales à 'pointe haute'") (1a-c), the alveolar affricates (3a-c), and the lateralised affricates (4a-c). Of the latter, Cantineau says: "la quatrième triade est formée d'occlusives dentales à occlusion faible, probablement semblables à la seconde triade, mais qui sont pourvues d'un appendice latéral" (1941/1960:17). Frication of some non-lateral kind would appear to be the only means by which the second triad could have been distinct, but whether this was in the form of affricates or fricatives is not known. It is known, however, that their reflexes in early Arabic, Akkadian and Ge'ez were fricatives (Cantineau, 1951/1960:281-2). Voiced, voiceless and ejective dental affricates are attested, but seem less common than alveolar affricates.

The apical obstruent subsystem as set up for Proto-Semitic, it is fair to say, is certainly not implausible and does not appear any more complex or 'exotic' than the equivalent subsystems in many modern languages (see the inventories in Lass, 1984:147-53, for example).

The apical obstruents from Proto-Semitic to Baghdadi and Cairene Arabic.

There are certain obvious phonetic changes that have taken place amongst these phonemes over the course of time that have affected all the modern Arabic dialects, e.g. the loss of ejectives, and the loss of lateral articulations in all but a few dialects, with even these only preserving laterality in the emphatic reflex of the triad (Cantineau, 1941/1960:56). Further phonetic changes in this class of obstruents have served to differentiate modern dialects from each other so that, for example, the reflex of Proto-Semitic /ŧ'/ is realised as a plosive in Cairene Arabic and a fricative in Baghdadi, and /ŧ*/ has become dental (or denti-alveolar) in Cairene but remained interdental in Baghdadi. These phonetic differences have resulted in the phonological relationships among the apical obstruents having a different structure in the two dialects. As can be seen by comparing tables V and VI below (p.36), Baghdadi Arabic has a three-way opposition in each of three series, thus preserving the triadic nature of Proto-Semitic, whereas Cairene Arabic has developed four-way oppositions in each of only two series.

The apical obstruent subsystem is clearly further removed in Cairene than in Baghdadi from what it was in Proto-Semitic, and the changes that have brought this about have involved phonetic processes and phonemic mergers taking different directions in the histories of the two dialects.

The dental stops (series 1). These have remained dental stops in all modern varieties but there has been some phonetic change and the phonological relations they contract have also changed. The voiceless member is aspirated in modern Iraqi Arabic (Al-Ani, 1970:44; Giannini & Pettorino, op.cit.:22) and in modern Egyptian Arabic (Shaheen, 1979:89), although Harrell states that in the latter aspirated and unaspirated allophones are in free variation when releasing a stressed syllable (1957:27). It seems likely that it was aspirated to some extent in Proto-Semitic if the three-way opposition was based on the glottal states set out in table II. According to Kim, aspiration will result if the glottis is widely abducted at the moment a plosive articulation is released (1970:109). With no significant changes appearing to have affected the voiced member, it remains to consider the emphatic.

Much discussion has centred around the classification of this consonant as *majhūr* by Sibawayh (Cantineau, 1941/1960:31; Al-Nassir, 1993:37-8; 46), a term sometimes interpreted as meaning voiced (El-Saaran, 1951:218), sometimes as the absence of breath

(Blanc, 1978:129). In a widely-quoted description of *iṭbāq* (emphasis) Sibawayh says that /ṭ/ without *iṭbāq* would be /d/ (El-Saaran, op.cit.:249-50). Cantineau inclines to the view that it was voiced but quickly became devoiced (1941/1960:32) and Garbell, for example, assumes it was voiced until the ninth or tenth century A.D. (1958:310). The voiced variants reported in Yemeni Arabic lend credence to this (Cantineau, 1941/1960:32) but there has been some doubt as to what extent they are in fact voiced. Blanc says "the Yemenite *ṭ* is not voiced but voice-indifferent, i.e. it has both voiced and voiceless allophones" (op.cit.::134), which in the dialect of Sana'a occur in non-geminates and geminates respectively (Watson, 1993:9). Sibawayh mentioned a "/ṭ/ that is like /t/" which Al-Nassir interprets as a devoiced or voiceless variant. He also notes that this was the form said by Ibn Ya'ish to be used by non-native speakers (op.cit.:20). Ibn Sīnā describes a /ṭ/ which according to Blanc is "clearly voiceless" (op.cit.:143, fn.32). It seems therefore that voicing was not as inseparable from realisations of this emphatic as it was with respect to the reflexes of the interdental and lateralised emphatics even at the time of these writers. Whatever the situation may have been, it is agreed that it is currently produced without glottal closure or vocal fold vibration in the majority of modern dialects, and in most of these, including Baghdadi, it is unaspirated (Al-Ani, op.cit:45). A glottal state is therefore indicated in which there is a narrow aperture between the vocal folds (Kim, op.cit:109; Catford, op.cit.:115) and where the degree of medial compression and adductive tension is greater than for voicelessness, perhaps not much less than that required for modal voicing. The precise state of the glottis in emphatics does not, however, have distinctive function in dialects such as Baghdadi because the main phonetic correlate of emphasis has ascended from location in the larynx to location in the pharynx (Martinet, op.cit.:95), and there is no other emphatic in the series.

By contrast, the glottal opening in realisations of Cairene /ṭ/ is wider than in Baghdadi as evidenced by the aspiration (Shaheen, op.cit.; Heselwood, 1992:254) and the greater voice onset time values in table IV compared to table III (pp.12-13), and we can assume that in this respect it shows more of a change from the Proto-Semitic ejective ancestor. The glottis must therefore be of a comparable width to that for realisations of /t/ and it seems reasonable to argue that this further weakening of laryngeal tension is at least partly due to the presence in the apical obstruent subsystem of /ḍ/ (see below).

The interdental consonants (series 2). By the time of the Arab grammarians of the classical period these had lost their occlusion and become fricatives (Cantineau,

1941/1960:40-41) with the emphatic having become pharyngealised and acquired voicing, probably in the manner described at some length by Martinet for all the voiced emphatics of Arabic that derive from the emphatics of Proto-Semitic (op.cit.:95-6). In summary, the glottal occlusion characterising ejectives weakened slightly to laryngealisation resulting in a constriction in the glottis accompanied by a narrowing of the laryngopharynx which may have involved ventricular and aryepiglottic constriction of the kind observed in English glottalised plosives (see e.g. Roach, 1979). The weakening would not necessarily entail a reduction in the degree of medial compression and adductive tension around the glottis: it could have involved merely a slackening of the longitudinal tension such as accompanies creak phonation (Laver, 1980:123), the mode of phonation most compatible with laryngealisation (Laver, 1994:330). The laryngopharyngeal constriction was then 'reanalyzed' as the salient phonetic correlate of emphasis and ascended higher up the pharynx; meanwhile the glottal constriction, freed from its role in realising emphasis, was able to assume a state compatible with a mode of phonation that did not require as much tension in the intrinsic laryngeal musculature as that associated with laryngealisation. If the forces of tension were reduced from strong to moderate, then modal voice phonation would result and the emphatic sound become phonetically voiced.

If the interdentals in Proto-Semitic were indeed affricates then they were subject to the common historical process of lenition and became fricatives.

Since these processes took place the situation with respect to this series has remained essentially unchanged in many varieties of Arabic, including Iraqi, but not so in other varieties. In most sedentary dialects, we see the effects of a merger between these interdental fricatives and the dental stops in favour of the latter (Cantineau, 1941/1960:26). However, the result of the merger of the two series of three consonants each is a series containing four consonants. The voiceless /θ/ merged with voiceless /t/, and voiced /ð/ with voiced /d/, but voiced /ð̣/ could not merge so readily with voiceless /ṭ/ due to the incompatibility of their respective glottal states (if Arabic /ṭ/ was at one time voiced (see above), then it must have devoiced before this merger). That is to say, the merger was between the features "fricative" and "stop", not between "voiceless" and "voiced". It became instead a voiced emphatic stop in these dialects, but not, it seems, until after the other two had already merged (Garbell, 1958:312). The phonological significance of this, apart from the disappearance of the complete interdental series, was that, perhaps for the first time in the history of any Semitic language, glottal states acquired distinctive function

in emphatic consonants. A different history thus attends the glottal states in the /t̞/:/d̞/ opposition from that attending the glottal states in the /t/:/d/ opposition: the latter derives from an opposition that existed in Proto-Semitic, while the former represents a much more recent innovation deriving from a voiced glottal state that initially did not have distinctive function, and still does not have it in the /ð̞/ of Baghdadi Arabic, and which can trace an ancestry back to a firmly closed state.

The sibilant consonants (series 3). The voiceless and voiced members lost their occlusive component at an early date resulting in the fricatives /s/[2] and /z/ found in all modern Arabic dialects. The history of the emphatic member is, as in the other series, more complicated than this. It is easier to explain the voicelessness of its current reflexes, compared to the voiced fricative reflex of the interdental emphatic, if the articulatory occlusion weakened to a stricture of close approximation *before* a reduction in laryngeal tension marked a move away from an ejective. The resulting fricative ejective [s'], however, is difficult to sustain for more than a very brief length of time because only the air between the larynx and the articulatory stricture is available for generating the friction (see discussion in Steiner, loc.cit.). By opening the glottis this air supply can be replenished to increase the duration of the fricative. If the laryngeal tension was to be redeployed in the laryngo-pharynx then it is not difficult to see how the modern [sˤ] could have evolved: Laradi, for example, suggests that larynx raising may actually cause movement of the rear pharyngeal wall (1983:302), and Gauffin reports that "glottal abduction and larynx tube constriction can be controlled independently" (1975:308). It is interesting, however, to note that, as with /t/, voiced variants are reported in Yemeni Arabic but Cantineau remarks that "il ne semble pas que le phénomène soit absolument régulier" (1941/1960:48). If this phoneme was generally voiced in early Arabic then a developmental sequence more akin to that of /ð̞/ but with a further stage of devoicing would be indicated. That its full history is a complicated one is indicated by the realisation of /ṣ/ as [st] without emphasis reported for a dialect strip in north west Yemen by Behnstedt (1987:7).

In Cairene Arabic the sibilant series has evolved into a four-member opposition, compared to a three-member oppostion in Baghdadi Arabic, because of the presence of the voiced emphatic /d̞/ deriving from the voiced emphatic of series 2. The phonematic situation is equivalent to the result of Arabic /ð̞/ splitting into /d̞/ and /ẓ/, but historically it was not actually a phonemic split: /ẓ/ seems to originate from 16th century

28

Ottoman pronunciations of Arabic /ð/, although Bosworth points out how little is known about these (op.cit.:154, fn.4)[3]. He also quotes Landberg's observation that "ce ne sont que les Ḥaḍar [town-dwellers] de la Syrie et de l'Egypte qui prononcent ظ comme un ز emphatique" (ibid.:157), i.e. as the emphatic correlate of /z/. A voiced contextually determined allophone of /ṣ/ already existed in some varieties which Garbell sees as facilitating the introduction of /ẓ/ as a phoneme (op.cit.:318). The appearance in the system of /ẓ/ for identifiable sociolinguistic reasons thus post-dates the appearance of /ḍ/ by several centuries. A comparison of their lexical incidences is beyond the scope of this study but there are minimal pairs in Egyptian Arabic, including some items that are clearly colloquialisms rather than reintroduced classicisms: e.g. /ʔiḍḍallim/ "to be made dark" vs. /ʔizzallim/ "to make a complaint", and /ḍarab/ "to hit" vs. /zarab/ "to crap" (my thanks to James Dickins for these examples). Establishing /z/ as a phoneme entails the conclusion that its voicing is distinctive because of the presence of the voiceless emphatic /ṣ/; the voicing of the cognate phoneme in Baghdadi Arabic - the interdental /ð/ - is not distinctive, there being no voiceless /θ/ in the system (although [θˤ] occurs as a contextually determined allophone of /θ/ in e.g. /θuntaʕaʃ/ (Al-Nassir, op.cit.:46-7)).

The lateralised consonants (series 4). As was noted above, there is considerable doubt about the existence of a voiced lateral affricate in Proto-Semitic for which there are no identifiable reflexes in the Semitic languages, and Leslau is adamant that there was no triad of lateralised obstruents (op.cit.:326). The voiceless lateral affricate has become a postalveolar fricative in all Arabic dialects - a fact which suggests a very early date for the process - and is consequently outside the scope of this study. It is the emphatic lateral affricate that is therefore of most interest, and in particular because its history is not dissimilar to that of the emphatic dental. It must have acquired voicing and lost its occlusion in the same way, resulting in its becoming a voiced pharyngealised interdental lateral fricative [ɮˤ]. The peculiarity of this sound was not lost on those whose language obliged them to produce it, prompting them to call themselves "those who speak with *ḍād*" (see Bosworth, op.cit.:154,fn.6; El-Saaran, op.cit:248). We know that it preserved its laterality up to and including the time of the renowned Arab grammarians of the eighth century because of the descriptions they gave it (Cantineau, 1952/1960:284; El-Saaran, op.cit.:249-51) but it began to lose it and to become confused with the voiced interdental non-lateral pharyngealised fricative [ðˤ] in the aftermath of the Arab conquests (Bosworth, op.cit.:154-6). In those dialects which had preserved the interdental fricative series the

29

merger became complete, e.g. Baghdadi Arabic, while in those where the interdentals had merged with the dental stops, among them Cairene Arabic, the lateralised emphatic merged with the voiced emphatic dental stop (Giannini & Pettorino, op.cit.:21, fn.2) which itself developed from the interdental emphatic fricative. Fig.1 shows these mergers.

Fig.1. *The merger of the lateralised emphatic in Baghdadi Arabic (left) and of the interdental fricatives and the lateralised emphatic in Cairene Arabic (right; a took place before b).*

Instrumental investigation.

Recordings of eight speakers were examined for voice onset times in relation to /t/ and /ṭ/. Four were speakers of the Muslim dialect of Baghdad (SK, TR, AL and LM) and four were speakers from Cairo (DR, LT, SW and AY); all subjects were adult males. Measurements were taken from their productions of prevocalic /t/ and /ṭ/ in the words /tāha/ 'to go astray', /ʃitāt/ 'scattered', /ṭābin/ 'a cook', /χaṭṭāṭ/ 'a calligrapher', using the spectrographic and speech waveform displays on a Kay Elemetrics DSP 5500 Sonagraph; in all cases the consonant releases a stressed syllable. Each word was produced twice by each speaker - once in isolation and once in the carrier phrase /mā maʃna ... bil-luɣat al-ingliːzija/ ("What does .. mean in English?"). Sixteen productions of each of the phonemes were thus collected for each of the two dialects; tables III and IV set out the results (measurements are in milliseconds to the nearest whole number).

The voice onset time (VOT) values express the length of time between the release of the articulatory closure and the onset of vocal fold vibration. In the data presented in tables III and IV there is a clear difference between the two sets of speakers when we compare the values for the two consonants. The range of values are almost coterminous

in the Cairene speakers but this is far from the case with respect to the speakers from Baghdad: for them the two ranges are almost discrete. This effect is even more striking if we leave out of account the atypical extreme value of 31ms (speaker SK (Baghdad) for /ṭāhin/), the only speaker with values more than two standard deviations from the mean. Intra-speaker behaviour shows that in the Baghdad dialect the VOT for /t/ is of the order of twice that for /ṭ/, a pattern found in the Cairo data only as an occasional random feature. Fig.2 presents the ranges and averages in the form of a scale. The standard deviation (SD) to the nearest whole number for /t/ in the Baghdadi data is 12ms with 81% of values falling within one SD, while that for /ṭ/ is 5ms with 75% within one SD. The

		/t/	individ range	group range	/ṭ/	individ range	group range
BAGHD	TR	22 tāha	19-48		13 ṭāhin	13-15	*
		19 tāha			15 ṭāhin		
		48 ʃitāt			14 χaṭṭāṭ		
		28 ʃitāt			15 χaṭṭāṭ		
	AL	27	27-31		14	12-19	
		28			19		
		31			12		
		31			14		
	LM	25	19-25	19-51	09	09-15	09-31
		20			09		
		22			11		
		19			15		
	SK	32	32-59		22	15-31	
		50			20		
		42			31		
		59			15		

TABLE III. *Voice onset times for realisations of Baghdadi /t/ and /ṭ/. The words are in the order as for speaker TR, with the values for the isolated form given first.*

CAIRO	AY	46	36-46		41	41-63	
		38			63		
		45			52		
		36			48		
	SW	16	16-31		24	15-44	
		29			44		
		30			15		
		31			23		
	DR	46	33-50	16-50	42	20-51	15-63
		33			51		
		50			30		
		36			20		
	LT	21	21-29		18	18-36	
		23			36		
		23			27		
		29			32		

TABLE IV. *Voice onset times for realisations of Cairene /t/ and /ṭ/. The words are in the order as for speaker TR in Table III.*

corresponding standard deviations for the Cairo data are 10ms (69% within one SD) and 14ms (63% within one SD). Spectrograms and speech waveforms of /tāha/ and /ṭāhin/ as produced by two of the Baghdadi speakers and by two of the speakers from Cairo can be seen on pages 38-41. Note the characteristic spectrographic formant resonance patterns with F1 and F2 clearly separated at the onset of the vowel after the non-emphatic and closely approximated after the emphatic (Giannini & Pettorino, op.cit.:23).

The results support a phonetic history for /ṭ/ - the emphatic that has probably undergone the most extensive changes in glottal state - characterised by progressive weakening of intrinsic laryngeal tension as shown in fig.3.

Fig.3a represents the glottal state in Proto-Semitic where strong medial compression (MC) and strong adductive tension (AT) held the glottis firmly closed for the production of the ejective [t']. With ejectiveness being the phonetic correlate of the distinctive feature "emphatic" at that time, this glottal state can be said to have had distinctive function in
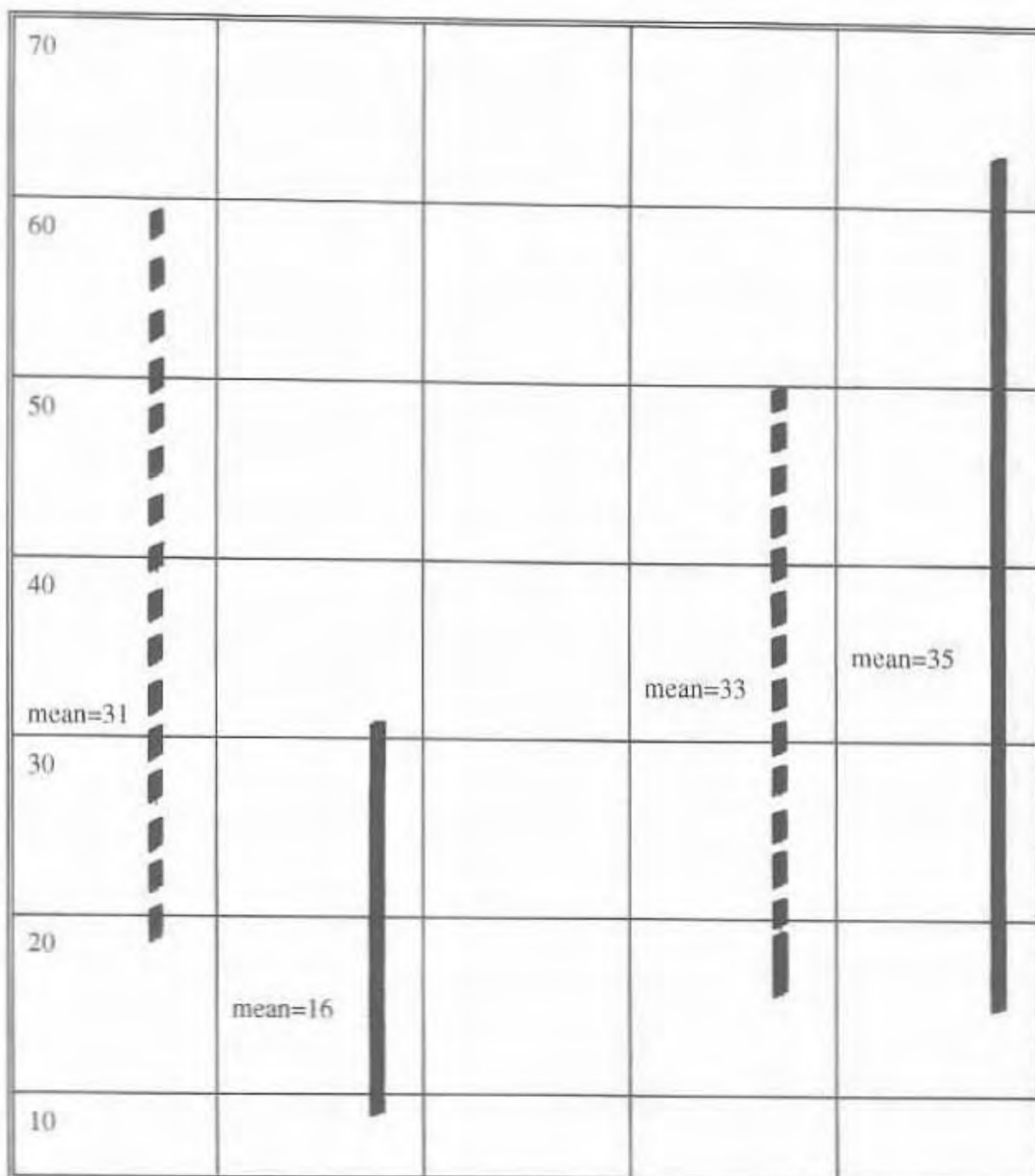
Fig.2. *Ranges and averages of VOT values for /t/ (dashed lines) and /ṭ/ (solid lines) in Baghdadi speakers (left) and Cairene speakers (right).*

Proto-Semitic. By the time of Early Arabic a longitudinal slackening of the vocal folds had

resulted in laryngealisation with MC and AT remaining strong (fig.3b). Laryngealisation thus became the phonetic correlate of "emphatic" which maintained the distinctive function of the glottal state. A reduction in the degree of MC and AT from strong to moderate then brought the glottis into the voiced state (fig.3c) but the phonetic correlate of the feature "emphatic" had taken the form of pharyngealisation meaning that the glottal state no longer had distinctive function; this was probably the situation until after the time of Sibawayh. The devoicing of /ṭ/, which Garbell places in the tenth century, represented a further reduction of MC and AT with the vocal folds parting and forming a narrow glottal opening (fig.3d). This is still the case in many dialects including Baghdadi where the absence of a /ḍ/ means this glottal state also has no distinctive function (see table V).

a) ejective   b) laryngealisation   c) modal voice   d) narrow glottis   e) open glottis
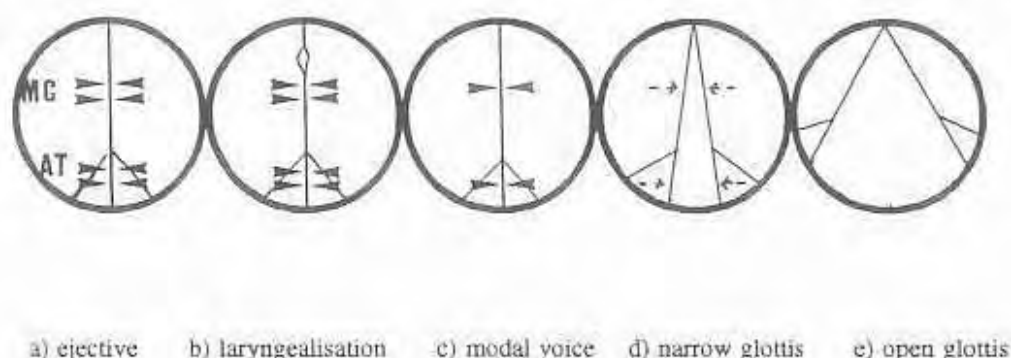
Fig.3. *Progressive weakening of intrinsic laryngeal tension in realisations of /ṭ/ from Proto-Semitic to modern Cairene Arabic. Double arrows = strong tension, single arrows = moderate tension, broken arrows = weaker tension, no arrows = no tension.*

In Cairene Arabic MC and AT have continued to weaken abducting the vocal folds and bringing the glottis into a fully voiceless state (fig.3e). However, the presence of /ḍ/ confers distinctive function on this glottal state (see table VI).

Glottal states and distinctive function.

Having outlined something of the conjectured history of the subsystems in the two dialects it is necessary now to turn attention to the phonematic relations that define them as

discrete synchronic states. As was noted above, voicing in emphatic consonants dates from when the phonetic correlate of emphasis changed from ejectiveness to pharyngeal constriction. Voicing did not, however, at that time have distinctive function in emphatics and the same can be said of voicelessness in e.g. /ṣ/. Only when a voiced and a voiceless emphatic came to exist in the same series as a voiced and a voiceless non-emphatic did the glottal state of emphatics aquire distinctive function, and this situation has arisen in Cairene Arabic[4], so that the correlation of emphasis and the correlation of voice cross-classify in the phonematic structure giving the homologies /ṭ/:/ḍ/::/ṭ/:/ḍ/ and /ṣ/:/z̧/::/ṣ/:/z̧/; there is no such cross-classification in the corresponding part of the phonematic structure of Baghdadi Arabic. We have seen the situation in Cairo Arabic come about due to the sum of separate phonetic changes and phonemic mergers. But the relationship of phonetic change to phonematic structure is not, as structuralists such as Martinet have long pointed out, just one way. The need for a phoneme to fit into a phonematic structure can reach a point where its realisations change to become analogous to the realisations of another phoneme or phonemes in the structure. Where a particular distinctive feature is found in two or more phonemes there will be a tendency for that feature to be realised in the same manner, other things being equal[5]. Comparing the dental stops in Baghdadi and Cairene (tables V and VI), the emphatic in the former does not have "voiceless" as a distinctive feature while that in the latter does. In Cairene it thus has the same glottal distinctive feature as /t/ and it seems to be realised in the same manner, i.e. with aspiration, indicating widely abducted vocal folds brought about by relaxing laryngeal tension. Because the voicelessness of Iraqi /t/ is not distinctive, the distinctive feature "voiceless" is not shared in common between /t/ and /ṭ/ and the voicelessness of the two takes a different form: unaspirated in the emphatic - suggesting narrowly abducted vocal folds and a weak-to-moderate degree of laryngeal tension - and aspirated in the non-emphatic, keeping it clearly distinct from voiced /d/[6]. The narrowed glottis and greater degree of laryngeal tension in realisations of /ṭ/ can be explained as vestiges of the firmly adducted vocal folds and strong degree of laryngeal tension which characterised the glottal state of the Proto-Semitic dental ejective stop (Steiner, op.cit.:88-9, fn.151).

Nor would this be the only such trace of earlier forms of the emphatics to survive into modern varieties of Arabic speech. A number of writers have noted a raising of the larynx during the production of Arabic emphatics, e.g. Panconcelli-Calzia (1924:48-9, cited in Laufer & Baer, 1988:184); Marçais, (1948:14); Laradi (1983:245). Giannini &

Pettorino claim that only the hyoid bone and not the larynx is raised in their data from a Baghdadi informant (1982:25) but examination of their X-ray photographs and tracings for productions of /l/ and /ḷ/ seems to this author to show some upward displacement of the larynx in the latter compared to the former (ibid.:figs. 14 & 15); the photographs for the other consonants are not clear enough to make a confident judgment. Lowering of the epiglottis towards the arytenoid cartilages was reported for the emphatics by Brücke (1860) and Haupt (1890) (discussed in Giannini & Pettorino (op.cit.:12-14)), a movement that implies contraction of the aryepiglottic fold; Laradi has observed this instrumentally for Tripolitanean Libyan Arabic with the tip of the epiglottis uncurling (op.cit.:236;265).

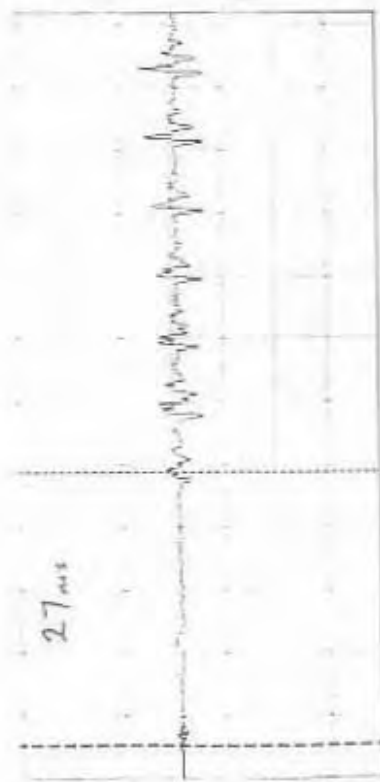|	Voiceless	Voiced	Emphatic
Interdental	/θ/ [θ]	/ð/ [ð]	/ḍ/ [ðˤ]
Dental stop	/t/ [tʰ]	/d/ [d]	/ṭ/ [t⁼ˤ]
Dental fricative	/s/ [s]	/z/ [z]	/ṣ/ [sˤ]

TABLE V. *Phonemes and principal allophones of the apical obstruent subsystem in Baghdadi Arabic (see Al-Ani, 1970:29).*

		Unemphatic	Emphatic
Dental stop	Voiceless	/t/ [tʰ]	/ṭ/ [tʰˤ]
	Voiced	/d/ [d]	/ḍ/ [dˤ]
Dental fricative	Voiceless	/s/ [s]	/ṣ/ [sˤ]
	Voiced	/z/ [z]	/ẓ/ [zˤ]

TABLE VI. *Phonemes and principal allophones of the apical obstruent subsystem in Cairene Arabic (see Harrell, 1957:25, 70-71).*

In the larynx-raising, then, we have perhaps an 'echo' of the Proto-Semitic ejectives (cf. Martinet, op.cit.:95), and in the action of the epiglottis an echo of the early Arabic successor to them. These features seem to be particularly marked for /ʈ/ which may indicate that the ejective realisation survived longer for this dental stop than for the other apical emphatic consonants, all of which involved some additional release feature: median affrication for /ʈᶿ/ and /t'/, lateral affrication for /tɬ'/. Early Arabic appears to have promoted the release features at the expense of the stop component in these three emphatics, but /t'/ had no release feature which could become a segment in its own right, and this would provide an explanation for any longer survival that it may have enjoyed as an ejective.

By analogy with the situation regarding the different glottal states in Cairene and Baghdadi /ʈ/ we should not be too surprised if it was found that patterns of modal voice phonation relate to distinctive function in a similar way. As was noted above, the modal voicing in the voiced emphatic /ð̣/ is most likely a phonetic development from complete glottal closure via laryngealisation whereas that in /ð/ is not. There is therefore reason to suppose that the patterns of vocal fold vibration may be qualitatively different in realisations of these two phonemes in the Arabic of Baghdad. In Cairene Arabic, however, we might expect an alignment of the pattern of vocal fold vibration for /ẓ/ with that for /z/ and to find that the voicing in both is qualitatively the same because it is realisational of the same phonological distinctive feature. This is something that deserves future study using techniques such as electrolaryngography and inverse filtering.
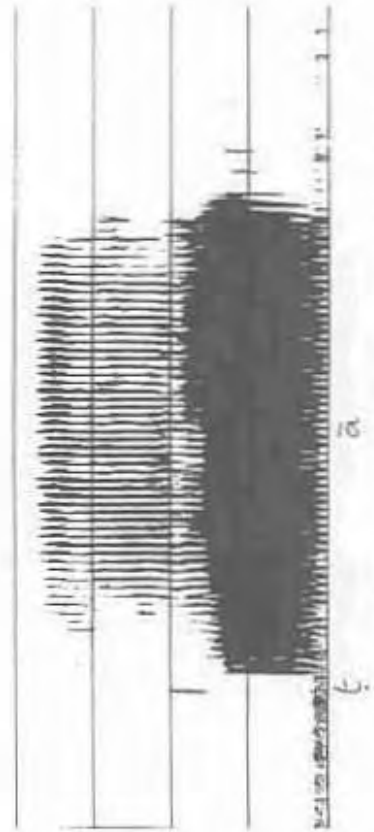
14 ms

Speech waveform for /t/; left cursor marks release burst, right cursor marks voice onset.

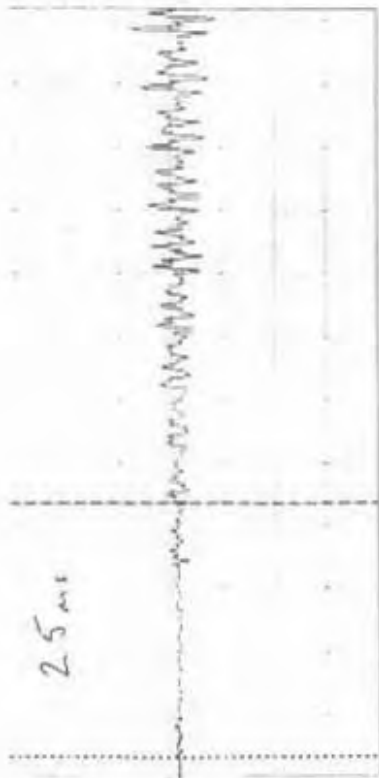Spectrogram of /ṭāhin/ showing approximation of F1 and F2.

27 ms

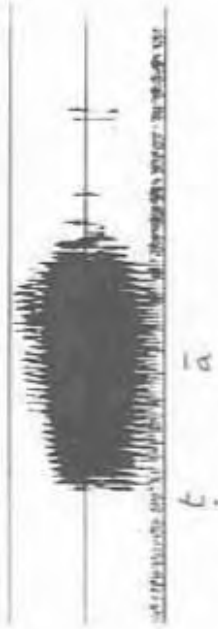AL (Baghdad) : Speech waveform for /t/; left cursor marks release burst, right cursor marks voice onset.

Spectrogram of /tāha/ showing separation of F1 and F2.

25 ms

LM (Baghdād) : Speech waveform for /t/: left cursor marks release burst, right cursor marks voice onset.

t ā

Spectrogram of /tāha/ showing separation of F1 and F2.

09 ms

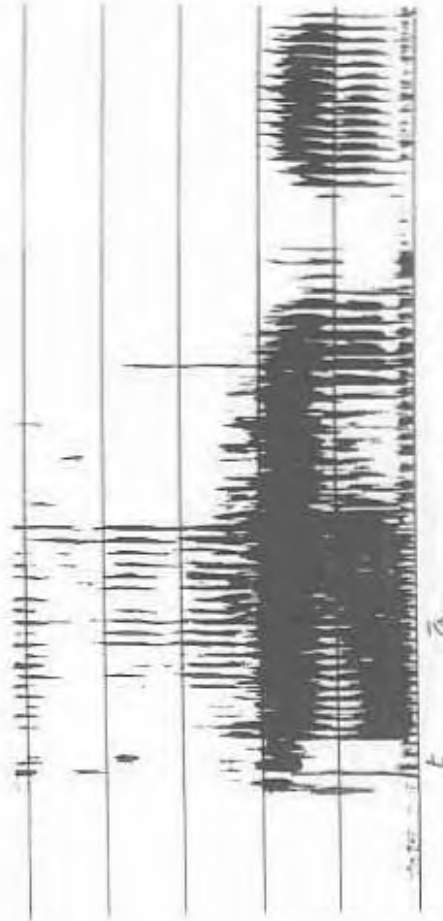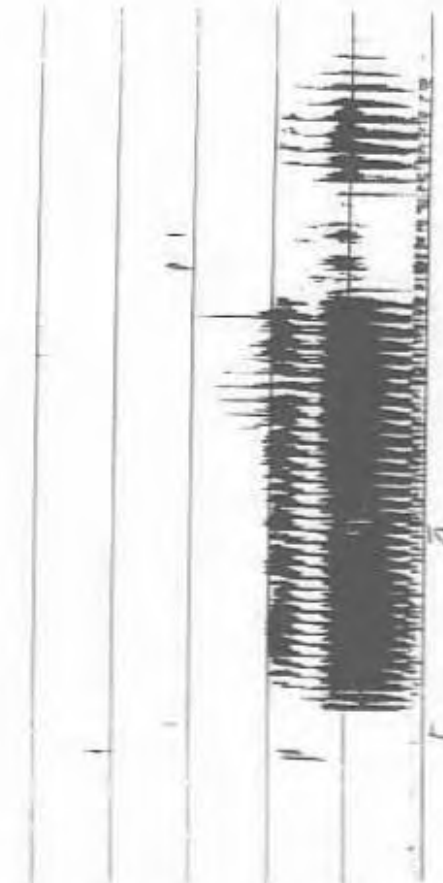*Speech waveform for /t/: left cursor marks release burst, right cursor marks voice onset.*

t̪ ā

Spectrogram of /t̪āhin/ showing approximation of F1 and F2.

39

46 m.s.

AY (Cairo) : Speech waveform for /t/; left cursor marks release burst, right cursor marks voice onset.

41 m.s.

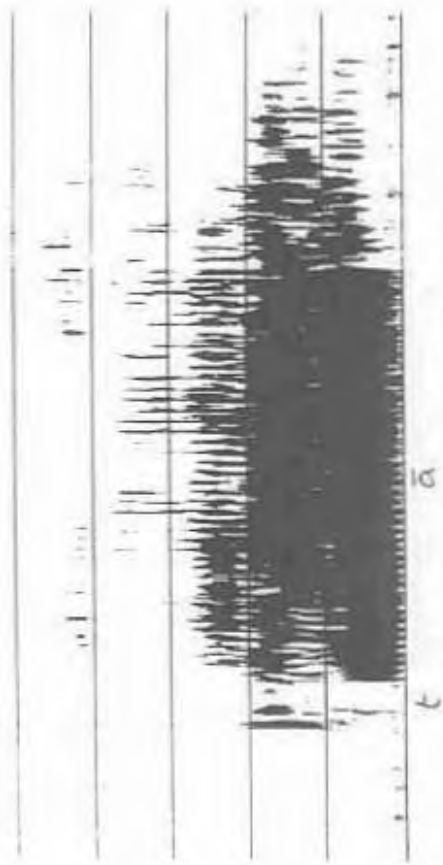*Speech waveform for /t/; left cursor marks release burst, right cursor marks voice onset.*

t   ā

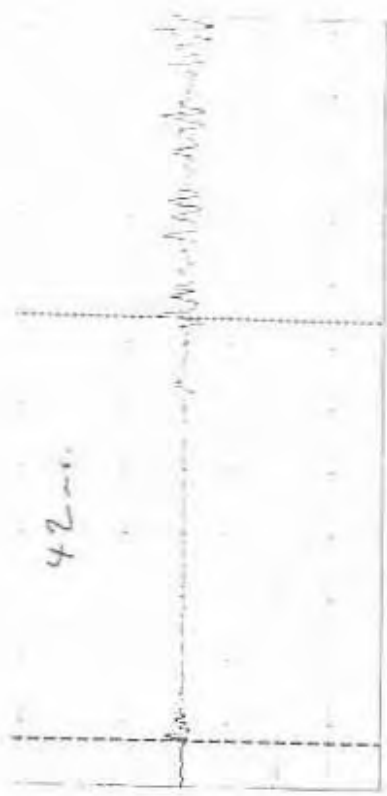*Spectrogram of /tāha/ showing separation of F1 and F2.*

t   ā

Spectrogram of /tāhin/ showing approximation of F1 and F2.

40

Speech waveform for /t/: left cursor marks release burst, right cursor marks voice onset.
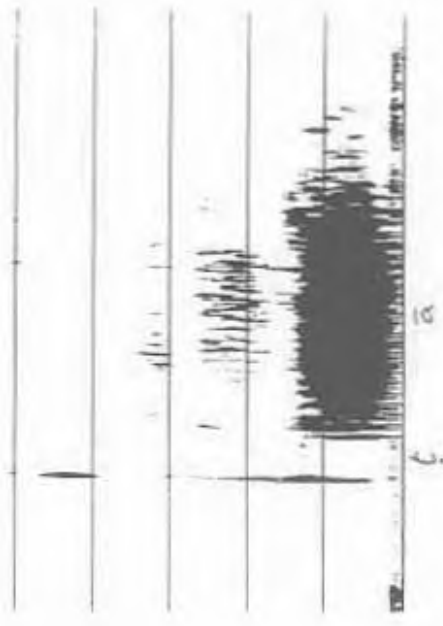

DR (Cairo) : Speech waveform for /t/: left cursor marks release burst, right cursor marks voice onset.

Spectrogram of /tāhin/ showing approximation of F1 and F2.

Spectrogram of /tāha/ showing separation of F1 and F2.

41

Footnotes.

1. It is possible to produce an ejective type of sound with the glottis in the voiced state but, as Laver notes, this "is certainly exploited extremely rarely in the languages of the world, if at all." (1994:369).

2. The history of Arabic /s/ involves also a merger between the reflexes of Proto-Semitic /tˢ/ and /ʃ/ at some point (Cantineau, 1941/1960:62-4).

3. Garbell notes that according to Feghali "the Turks actualized /ð/ as plain [z] and that the Arabs emphasized this sound in order to make it conform to the phonemic pattern of their language." (1958:317, fn.59).

4. Egyptian Arabic, in common with virtually all modern varieties, has extended the feature of emphasis to apical sonorants and to non-apical phonemes. According to Lehn the Cairo dialect exhibits an emphatic-unemphatic opposition throughout the phoneme inventory (1963:30), but his statement that there is "free variation between forms with and without emphasis" (ibid.:33) is puzzling unless it is an artefact of his 'syllable prosody' approach. The present study, however, is confined to the reflexes of the Proto-Semitic apical emphatics.

5. Lass is right to deny that linguistic changes are merely mechanistic responses to the 'needs' of linguistic structures, and to insist on the importance of language as cultural activity, even as a form of play (1980:135-6), but this does not mean that structural factors can never enter into the complex of influences that bring change about, or that maintain things as they are. It has to be acknowledged that we can never confidently identify the precipitate cause of a given linguistic change any more than any other kind of historical event, but we can attempt to identify a number of possible contributory influences, and structural factors cannot be ruled out as one of them (see, for example, Aitchison, 1981:146-52).

6. The distinction is not as clearly realised in some contexts as in others (Shaheen, 1979:87) - there may even be positions of neutralisation - but where the distinction is clear it justifies setting up the /tˤ/:/dˤ/ opposition as "voiceless":"voiced".

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EMPHASIS IN ṢANʿĀNĪ ARABIC.[1]

Janet C.E. Watson, CMEIS, University of Durham.

0. Introduction.

In this paper I consider the phonological effects of emphasis in Ṣanʿānī Arabic. In Ṣanʿānī Arabic emphasis has two or three articulatory correlates: pharyngealization - velarization and prolabialization (also termed labialization). With the traditional emphatics, *ṭ*, *ṣ* and *ḍ*, pharyngealization and prolabialization co-occur, and both of the phenomena, but more strikingly prolabialization, spread to other segments within the phonological word. The main part of this paper is concerned with finding a phonological representation to capture the natural co-occurrence of pharyngealization and prolabialization. In addition, the domain of emphasis for this dialect is shown to be the phonological word (where phonological word is defined as that unit which has a single word stress) to the right (and to a lesser extent to the left) of, and including, the emphatic.

1. Labialization of high vowels in the environment of emphatics.

It is well known that emphatic consonants often have a lowering (and hence pharyngealizing) effect on long vowels within the syllable (e.g. *qēmah* for *qīmah* 'price', *sōq* for *sūq* 'market', cf. Greenman, 1979 for Central Tihāmī Arabic, Behnstedt, 1985:50, also on short *u* in Baraddūn *ḍoġoṭat* for *ḍuġuṭat* 'fece (f.) pressioni", etc. Bettini, 1985:123-124; cf. Harrell, 1957:69 for Egyptian). High front vowels are usually retracted to a more central or back position in the environment of emphatic consonants (Laver, 1994:327), and low vowels are backed (Harrell, 1957:69). In addition, for many dialects of Yemeni Arabic the short vowel of the imperfect verbal stem is realised either as *a* or *u* when one of the root consonants is emphatic, but never as *i* (as in *yuḍrub* 'he hits', *yiguṣṣ* 'he cuts' *yiṭuffi* 'he puts out', cf. Goitein, 1970:xvi, and Qafisheh, 1992:66 for Ṣanʿānī; Bettini, 1985:121 for Baraddūn; also examples in Rossi, 1939[2]). In Ṣanʿānī, verbs of the pattern *fuʿul* in the perfect usually have an emphatic consonant or a velar consonant in the root (as in *ʿuṭuš* 'to become thirsty', *wuṣul* 'to arrive', *ḍuḥuk* 'to laugh', *muṭur* 'to rain', *ʿuṭus* 'to sneeze' *kubur* 'to become big', *kuṭur* 'to become many'; cf. Qafisheh, 1992:44, and Goitein, 1970:xvi,

45

1960:366). In some dialects short high vowels are invariably realised as *u* in the immediate environment of emphatic consonants (as in the Iraqi names *nāḍum* and *kāḍum*).

In Ṣanʿānī Arabic, prolabialization of short high vowels extends beyond the domain of immediate adjacency and applies to all vowels within the phonological word to the right of, and to a far lesser extent to the left of, the emphatic. Goitein notes for Higher Yemen that 'the emphatic ... consonants ... not only change the adjoining vowels, but color all the vowels in the same sound unit' (Goitein, 1960:360-361). Examples include:

1.	*ṭayyibih*	is realised as	*ṭayyubuh*	'good f.s.'
	maṭragih	is realised as	*maṭraguh*	'hammer f.'
	ṭawīlih	is realised as	*ṭawīluh*	'tall f.s.'
	guṣṣih	is realised as	*guṣṣuh*	'he cut it m.'/'story f.'
	yiṭambilayn	is realised as	*yuḍambulayn*	'they f. drum'
	yiṣaffihin	is realised as	*yuṣaffihun*	'he cleans them f.'
	bayn-agḍihin	is realised as	*bayn-agḍihun*	'I am spending them f.'
	ḥāfiḍlih	is realised as	*ḥāfiḍluh*	'remembering m.s.'

While most examples of high vowels realised as *u* have the *u* vowel *following* the emphatic, in a few cases a *preceding* high vowel is realised as *u*. This is particularly the case with the imperfect prefix of final weak verbs (Watson, 1996:267):

2.	*yiḍwī*	is realised as	*yuḍwī*	'he goes home'
	yisfī	is realised as	*yuxfī*	'he cleans'
	yixṭā	is realised as	*yuxṭā*	'he walks'

Prolabialization of the prefix vowel occurs predominantly with form I final weak verbs, but is also less commonly found in form II and quadriliteral final weak verbs:

3.	*yiṣaffī*	is realised as	*yuṣaffī*	'he cleans'
	yiṣalfī	is realised as	*yuṣalfī*	'he cleans'

In certain words, the sounds *ʿ* and *ġ*, but apparently not *ḥ* or *x*, may also induce prolabialization of high vowels to the right or left of the emphatic:

4.1	*rābiʿ*	is realised as	*rābuʿ*	'fourth'
	sābiʿ	is realised as	*sābuʿ*	'seventh'
	ġudwih	is realised as	*ġudwuh*	'tomorrow'

4.2	*ʿirs / ʿiris*	has a variant	*ʿurs / ʿurus*	'wedding'
	yiʿjā	has a variant	*yuʿjā*	'he suckles'

46

In most cases, however, the dominant *laryngeal* feature of the pharyngeals ^{c} and *ḥ* overrides the prolabial feature, particularly before the feminine ending *-ih* and after the imperfect prefix *yi-*:

5.   *fātiḥih*   is realised as   *fātiḥah*   'opening'
     maṣnū^{c}ih   is realised as   *maṣnū^{c}ah*   'made f.'
     tiḥwi   is realised as   *taḥwi*   'it f. contains'

And *u* is often lowered to *o* (Goitein, 1970:xvii), as in:

6.   *ḍuḥ(u)kat*   is realised as   *ḍoḥkat*   'she laughs'
     yiṣbuḥ   is realised as   *yiṣboḥ*   'he becomes'

2. Prolabial prosody.

Long-distance prolabialization of high vowels, such as in the examples *ṭayyub*, *ṭāguh* 'window f.', *bayn-agḍihun* etc., where the high vowel is not immediately adjacent to the emphatic consonant appear problematic - as transcribed here, the suggestion is that prolabialization is 'switched off' after the emphatic then 'switched on' for the high vowel. Spectrographic analysis of the near-minimal pairs *mistadīrih* 'round f.' and *mistaḍīluh* 'long' carried out at Leeds Metropolitan University by Barry Heselwood shows that 'switching off' does not occur, however, and rather that the entire phonological word is endowed with a prolabial prosody. Prolabialization is weak before the emphatic consonant, and strong following the emphatic. Consider the following text. Words in which prolabialization is evident are highlighted in bold:

7.

    *hāḍa l-makān ḥagganā, makān ya^{c}ni kabīr, mišū zuġayri, fa-hū **ḍūluh** ^{c}**arḍuh** ṭalāṭih mitr fi xamsih hākaḍā, ṭalāṭih mitr fi xamsi mtār. fi l-makān ḥagganā 'arba^c ṭigān, ṭintayn ṭigān bi-**ḍullayn** ^{c}ala š-šāri^c wa-ṭintayn ṭigān bi-**ḍullayn** ^{c}ala l-ḥawi. ṭab^{c}an hāḍa l-makān bi-nilja' lih li-l-xazzān. ma^{c}i fi l-makān hāḍā tiliviziyūn wa-fidiyū w-msajjilih, wa-mafrūš bi-mafāriš wa-firiš ya^{c}ni ^{c}alā šakl **aṭ-ṭābu^c** al-yamani ma^c al-wasāyid, wa-fih al-madāki', ya^{c}ni lli bi-nxazzin ^{c}alayhin bi-ntki' ^{c}alayhin. wa-m^{c}i madā^{c}ah fi l-wasaṭ ṭab^{c}an. wa-l-madā^{c}ah hāḍā*

madāᶜah la-t-tadxin, kull wāḥid yiᶜrafhā fī l-yaman, hāḏa l-madāᶜah bi-šakl gaṣabuh hākaḏā ḏawiluh wa-min nāzil ᶜalā šakl kurih, ᶜalā šakl al-jawzih jawz al-hind hāḏā wa-bi-tkūn markūzih ᶜalā jallās. al-jallās ᶜu-ykūn ṣaḥn mdawwar aw yikūn bi-šakl allī hū mawjūd maᶜī fī l-madāᶜah, bi-š-šakl aṭ-ṭulāṭī hākaḏā. ... al-madāᶜah maṣnūᶜah min al-xšab. wa-fī l-madāᶜah ṭabᶜan hāḏā, ᶜalā-mā gult anā gabl šwayyih innahū bi-šakl al-jawzih, jawz al-hind. jawz al-hind hāḏā aᶜtagid innū ... bi-yiḥfarūhā min dāxil bi-yiḥfarūhā yixallawhā zayy al-kurih, bi-hāḏa š-šakl, bass mistadirih lā mistaḏiluh, wa-min šān taḥwi hāḏa l-kurih hāḏā ʾaw nsamnih iḥna l-jawzih. al-jawzih hāḏā taḥwi al-mā'.

3. Prolabialization as secondary articulation.

Prolabialization occurs not only as a 'tertiary' articulation in the emphatics, but also as a secondary articulation with the labial consonants *m* and *b* in limited contexts in Ṣanᶜānī Arabic.' Examples include:

8. *ummʷī*   'my mother'   versus   *ummi* 'illiterate'
    ummʷak 'your m.s. mother' [agress.]   *ummak* 'your m.s. mother' [non-agress.]
    mʷān   'who?!' [call] versus   *man*   'who'

Some examples do not fall into obvious minimal pairs, but still deserve mentioning. These include one example of a labialized velar:

9. *šummʷī*   'smell f.s.!'
    ḍubbʷī   'fly'
    jubʷā   'roof'
    mumkʷin 'possibly'

Prolabialization here is accompanied by velarization and by weak constriction of the pharynx, rather providing a mirror image of secondary pharyngealization with accompanying prolabialization discussed above. This double secondary articulation is indeed a natural co-occurrence, just as the glide *w* involves constriction at both the lips and the velum; and indeed 'specialists in African and Caucasian languages ... tend to use the term 'labiovelarization' [in place of labialization], because labialization "is not confined to the rounding of the lips but inflicts upon the whole sound also a raising of the back part of

48

the tongue'" (Jušmanov, 1937:28 in Jakobson and Waugh, 1979:116-117)).

4. A phonological analysis of 'emphasis'.

The problem with considering emphasis articulatorily in terms of the three distinct points of articulation given above is that the communality of different correlates of emphasis - including vowels affected by emphasis spread - is lost. An examination of emphasis in Ṣanᶜānī Arabic led me to reconsider distinctive features of emphasis articulatorily by examining their auditory and acoustic characteristics.

Emphasis is typically described by speakers as having a 'dark' (Laver, 1994:327 and others), less commonly a 'heavy', 'dull' (Harrell, 1957:71), 'deep' or 'hollow', quality. This 'dark' quality is achieved acoustically by a downward shift of some of the upper frequency (principally F2) components, and is given the musical feature 'flat' by Jakobson (Jakobson and Halle, 1980:43-44; Jakobson and Waugh, 1979:111ff., 117-118). Flat contrasts with non-flat and, at the opposite end of the scale, with sharp (Jakobson and Waugh, 1979:111ff.). Secondary articulations which lower the frequency of F2 include prolabialization, pharyngealization and velarization. When speakers of a language which does not have pharyngealization interpret Arabic emphatics, evidence is that they will employ whatever devices they have in their language to produce similar auditory and acoustic effects: thus Jakobson notes that speakers of Uzbek and Bantu tend to pronounce Arabic emphatics with secondary labialization rather than pharyngealization since these languages do not have secondary pharyngealization: thus *ṭ* is pronounced as *tʷ*, *ṣ* as *sʷ*, etc. (Jakobson, 1970:271). Prolabialization, pharyngealization and velarization, three apparently different articulations in terms of their *points of articulation*, share not only acoustic and auditory sameness but also articulatory sameness when not the point of articulation, but the volume and hollow shape of the mouth resonator together with the sulcalized shape of the tongue³ is considered (Jakobson and Waugh, 1979:116).⁶ Flat sounds are achieved by an expansion of the volume of the mouth resonator accompanied (and facilitated) by sulcalization of the tongue and by peripheral constriction (of the lips at the front and/or of the pharynx at the back). Once we can see prolabialization and pharyngealization/velarization as articulatorily similar - since both involve an expansion of the volume of the mouth resonator plus peripheral constriction, it is then a short step to

49

appreciate the co-occurrence of labialization with pharyngealization (cf. Laver, 1994:411) since the two reinforce the acoustic effects of each other by further increasing the volume of the mouth resonator: Jakobson notes that there is 'a tendency ... to emit pharyngealized phonemes with a lip protrusion and slight rounding ... on the other hand, the rounded phonemes occur with a slight narrowing of the pharynx to reinforce the acoustic effect of labialization ... whatever orifice is contracted, there appears to be concomitant velarization: it pertains not only to the pharyngealized, but also to the labialized phonemes' (Jakobson, 1970:272-273). Harrell describes the articulation of emphatic phonemes in Egyptian Arabic as involving 'lip protrusion and/or pharyngeal striction' (Harrell, 1957:69). And Catford reports that in two languages of the Caucusus - Uzbykh and the Bzyb dialect of Abkhaz 'we have the usual phenomenon of the co-occurrence of the features labialized and pharyngealized on uvulars' (Catford, 1977b:290) cited in Laver, 1994:328).

One of the consequences of using the feature flat is that not only traditional emphatics are distinguished by flatness, but also other sounds which have similar acoustic effects (and, in the way that we have defined above, articulatory effects) - namely the labiovelar glide w and its vocalic counterpart u which both combine labiality with velarity, and, in certain dialects of Arabic often serve to labialize (and thus flatten) consonants (cf. Watson, 1989; cf. Dickins, this volume), and the retracted allophone of the vowel a. The opposite feature, sharp, then distinguishes the palatoalveolars $š$ and j as well as the palatal glide y and its vocalic counterpart i, which synchronically and diachronically have, in several dialects of Arabic, come to palatalize (and thus sharpen) originally non-sharp consonants (cf. Watson, 1992; Johnstone, 1967). The implications for phonological theory seem to be, at least from the point of view of the listener who is a native speaker of another language, that distinctive features are more abstract than many current phonological models propose (Heselwood, p.c.): on the basis of auditory/acoustic factors, emphasis is interpreted as flat (and articulatorily as an enlargement of the mouth resonator) by the listener and reinterpreted articulatorily as labialization, pharyngealization and/or velarization depending on the phonology of his/her own language.

Footnotes.

1. Thanks to those who attended the Second AIDA Conference in Cambridge for comments. Thanks in particular to Barry Heselwood for spectrographic analysis of my data, and for reading and commenting on a draft of this paper, and to S.J. Hannahs and James Dickins for providing comments on a later version. Thanks also to the University of Durham for a Special Staff Travel Grant which was used to collect the data used in this paper, to Tim Mackintosh-Smith for assisting in my data collection and to Abd al-Salām al-Amri for providing much of the data. A slightly different version of this paper is to appear in the *Proceedings of the Second AIDA Conference*.

2. While not explicitly mentioning the relationship between *u* and emphatic consonants, Rossi gives examples of *u* vowels in words containing emphatics where *i* is found in words lacking emphatics:

ṭurwag	'roads'	versus	*birwak*	'ponds'
yiṭallub	'he begs'	versus	*yilabbis*	'he dresses (s.o.)'
muṭallub	'beggar m.'			

3. For Lebanese, Haddad (1983) cited in Kenstowicz (1994:42) shows that when the root [rxṣ] 'become cheap' maps onto the CiCiC template a non-final *i* is realised as [u]: *ruxiṣ* 'became cheap' versus *riṣis* 'became tender' (from the root [rxṣ]).

4. This can be compared to the pharyngealization of labials *b* and *m* in Egyptian (Cairene) Arabic in words such as *bāba* 'pope' versus non-emphatic *b* in *bāba* '[month in the Coptic calender]', *māma* 'mama' versus non-emphatic *m* in *hamāma* 'dove', and *mayyiti* 'my water' versus non-emphatic *m* in *mayyiti* 'my dead one' (Harrell, 1957:74-75).

5. Sulcalization has the effect of further enlarging the mouth resonator. In several languages, prolabialization often accompanies sibilant sounds which are marked, among other things, by sulcalization of the tongue.

6. Perhaps the Arabic terms *muṭbaq* and *mufaxxam* best capture emphasis in terms of articulation: *muṭbaq* (Sībawayh, vol. IV:436) 'lidded' or 'enclosed' (Al-Nassir, 1993:50) gives the sense of a fairly large contained or enclosed resonator, while the basic or etymological sense of *mufaxxam* entails 'corpulence' and 'swelling' and thus describes the 'enlargement' or 'puffing out' of the mouth resonator. The opposite of *mufaxxam*, *muraqqaq*, entails 'being thinned out' and can thus be seen to describe the 'thinning out' of the mouth resonator produced by palatalization.

7. In the speech of my two-year old daughter, the phoneme /l/ is pronounced as [y] or nothing at all in place of clear *l*, e.g. *[y/o/yi]* 'lolly', *ha[y]o* 'hello', *[y]ait* 'light', *ūsi* 'Lucy', *piz* 'please', but as [w] in place of dark (i.e. velarized) *l*, e.g. *pu[w]* 'pull', *pa[w]i* 'Pali', *bo[w]* 'ball', *to[w]d* 'told', *samiyu[w]* 'Samuel'.

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