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Three topics in Arabic phonology:

Some speculations on the vowel system of Classical Arabic

by J. Diekins
University of Durham

Glottal states and emphasis in Baghdad and Cairene Arabic: synchronic and diachronic aspects

by B. Heselwood
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Emphasis in Șanʿānī Arabic

by J.C.E. Watson
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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 Dickinson's 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 Dickinson's 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 /t/ in these dialects. The theme of the interrelationship between structural potential and the actualisation of this potential in speech is also taken up by Dickinson 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 Dickinson's 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
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 interpreters 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.
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 γαμμα, which is a small waw, and represents the vowel [i] by κασρa, which is a small ya'a. 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. bai/bayt "house"). Of the three Arabic "vowels" therefore /u/, /w/, and /i/, both /u/ and /i/ have consonantal as well as vocalic realisations, while /a/ has only vocalic realisation.


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

2.1 'Alif al-tafṣīm and the vowel combination aːl(/aːl/).

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 'imāala, i.e., phonetically speaking the fronting and raising, of /aː/ when it occurs in the context of a /iː/ or /yː/. Thus the /aːl/ combination in the word, "aːlid "worshipper" seems to have been pronounced something like [eː] due to its occurrence in the context of the following /iː/; i.e., this form was pronounced something like [eːːːː] (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 /aːl/ as [eː] is purely a function of the context in which it occurs. Crucially, it does not contrast in this context with a sound /aːl/ (or similar) which might be the pronunciation of a different word. Accordingly, [eː] here can simply be regarded as an allophone of /aːl/. Since [eː] is an allophone whose occurrence is determined by the its being in the context of /iː/, it is what is known as a contextually determined allophone of /aːl/. 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 /uːl/ and /iː/ or /yː/ can be regarded as allophones of single phoneme /iːl/.

I turn now to the question of 'alif al-tafṣīm. Sibawayh says that 'alif al-tafṣīm is a variant of 'alif يُعتَني بلغة أهل المغز في قولهم الحنأة والزنكأة والحياة (Sibawayh, 1982: 432; cf. al-Nassir, 1993: 103). Rabin suggests that "the accounts of the tajwīd works leave no doubt that the final syllable of these words was pronounced as an ə, not as a u" (Rabin, 1951: 106), while al-Nassir argues that the pronunciation was probably "somewhere between the cardinal vowels Number 6 ə and Number 7 "o" (al-Nassir, 1993: 103). Rabin assumes that what was involved in this pronunciation was simply a "position-variant of the n-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-tafṣīm was merely to be regarded as a "position-variant", i.e., a contextually determined allophone of /aːl/, an analysis which is adopted by al-Nassir (1993: 103). This is the obvious interpretation of the remarks
about 'alif al-tafsīm made by Sibawayh himself, where it is listed as one of the "secondary" letters (بَذْوَر). "which are widely used and approved in the reading of the Quran and poetry" (Sibawayh, 1982: 432).

This analysis may be correct; i.e. it may simply be the case that 'awl in this context in the Hijazi dialect was realised as [ɔ̄]/[ɔ̄]. Rabin supports his argument by noting a spelling peculiarity of words containing 'alif al-tafsīm, namely that in the Quran 'alif al-tafsīm "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: yādā 'prayer', hāyā 'life', zādā 'alms', nūjāh 'deliverance', ḍhāzāh 'morning', miskāh 'lamp-niche', mīnāh 'the goddess Manat'. To these must be added ar-rihā (written 'alaw) 'usury'" (ibid); i.e. salāq, for instance, was written صلوة. Rabin concludes, "There is no reason to think that other words of the same time [type?], such as ghāzāh, nūjāh, 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-tafsīm disappears before pronoun suffixes (ibid.).

It may be that all nouns of this type were pronounced with 'alif al-tafsīm in Hijazi dialect. However, this does not by itself demonstrate that the phenomenon was allophonic. Nor does the fact that this 'alif al-tafsīm disappeared when pronoun suffixes were added indicate that 'alif al-tafsīm was allophonic. One need only consider the preposition  محمد in Standard Arabic, which takes the form  محمد before pronoun suffixes ( محمد-"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  محمد of the  محمد marbuuta[ ] disappeared, the vowel indicated by  محمد was final and stressed" (ibid: 105), i.e. in the case of صلابة/صلابة. for example, one had a pronunciation along the lines [ṣalā]:. It might appear that there should be a contrast between this and the pronunciation of  محمد "he roasted/fried", which would presumably be something like [ṣalā]. Unfortunately, this contrast would appear to have been invalid in Hijazi Arabic, where a form such as  محمد with an imperfect, seems to have been pronounced [ṣalā] (ibid: 161). One would need to opt for a verb such as  محمد (imperfect  محمد "to exceed the proper bounds", or  محمد (imperfect  محمد "to put to the test" to provide an imperfect (but still acceptable) contrastive pair with صلابة in Hijazi dialect, since in this dialect it was only such imperfect verbs which were pronounced with final "a". If the pair صلابة محمد ([ṣalā]_[ɡalā]) provided a valid contrast in their final vowels, it would have to be concluded that 'alif al-tafsīm was phonologically opposed to the normal 'alif.
Unfortunately, there are additional complications associated with this counter-proposal. It might, for instance, be the case that ملأ and بلأ were differently stressed from مصليا, with the stress on the final syllable in مصليا and on the first syllable in بلأ, 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 'a'rif al-ta'fi'im and [a:] would not stand, or it would at least be considerably undermined. One would thus be forced back to a comparison between مصليا and other correspondents such as [kala:] "[indeed] no", or فلأ [fala:] "and so ... not", where the pronunciation of Modern Standard Arabic suggests that the stress would have been the same as that of مصليا.

Another potential problem with the proposed counter-analysis is that it might be that Rabin's assumption that the ta'zi marhuta was at this stage phonologically irrelevant in pause is incorrect. It may be, as Fischer has argued (Fischer, 1956: 36), that forms with ta'zi marhuta were at this early stage pronounced with a final [h]. In this case the pronunciation of مصليا in pause would have been something like [saloχ]. This would obviously render a proposed contrast with ملأ/فلأ even invalid. There are, however, other forms which one might reasonably contrast with the proposed pronunciation of مصليا as [saloχ] in pause. A near-minimal pair would seem to be established, by مصليا [saloχ] vs. بلأ [balach] '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 'a'rif al-ta'fi'im is phonologically different from (opposed to) the normal 'a'rif [a:].

If 'a'rif al-ta'fi'im was phonologically different from the normal 'a'rif at this stage, and assuming this "normal 'a'rif" to be merely a combination of the two /a/-vowels, what could 'a'rif al-ta'fi'im be phonologically? Rabin suggests that the obvious alternative possibility would be to recognise an additional /i/ 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 /i/, as there are short /i/, /i/, /i/, as well as long /i/, /i/, /i/). 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 مصليا etc. as مصليا etc. in old codices, would be to regard the 'a'rif al-ta'fi'im as the standardly non-permissible vowel combination /ua/ (i.e. 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 glottal. The analysis implies that 'alif al-ta'fiim could be written as "ل"، i.e. that "صلوة" in Hijazi Arabic could have been written as "صلوة".

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

It is also worth considering the term ta'fiim in a little more detail. Al-Nassir remarks that apart from the 'alif al-ta'fiim, "No other segment is described by Sibawayh to be mufakham" (al-Nassir, 1993: 103). Another, apparently early use of the term mufakham, however, is to describe the 'l'-sound which occurred in allah (Gairdner, 1978: 197). This appears to have been a dark 'l', i.e. a velarised [l], as opposed to the light 'l', i.e. the non-velarised [l], which was normal for Classical Arabic. The [l] of allah 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 [l] is differentiated from [l]: Ferguson cites walla/thu "and God" vs. wella/thu "and he appointed him (governor)" (Ferguson, 1978: 158). However, the [l] apparently only occurs in allah '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 Hesselwood, 1992: 133-156).

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. /q, /j, /t, /y, /s, and /l/ - muthaq "lidded", while all the other phonemes are described as munfatih "open" (Sibawayh, 1982: 436; cf. al-Nassir, 1993: 50). Sibawayh, however, also describes the four "lidded" letters, plus the velars /q, /y, /s, and /l/ خ, as mustat'ill, or "high" (Sibawayh, 1982: 129; cf. al-Nassir, 1993: 51). The "highness" of these sounds was a matter of their being "raised to the upper palate"; that is to say, all the mustat'ill letters were "velaric" or "uvularic". In the case of /q, /y, and /s, خ, this velariness or uvulariness was a case of their primary articulation, i.e. these sounds were velars or uvulars. In the case of the muthaq letters, this velariness or uvulariness 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 mufakham "l" of allah was velarised, it seems plausible that the ta'fiim of the 'alif
al-tafsiim also involved some velar feature (as noted in Section I). The phoneme /u/w/ is a velar. The suggestion that 'alif al-tafsiim involved the vowel combination /aa/ thus appears consistent with the overall phonetics of emphasis and wider uses of the term tafsiim 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 fi'ul normally have an emphatic consonant or a velar consonant in the root" (Watson, this volume: 45), e.g. talać ḫe went up", ḫadār "he laughed", čutras 'he got thirsty', muṣar "it rained". It has also been proposed by Heselwood that /w/ in modern standard Arabic be regarded as the emphatic counterpart of /u/ (Heselwood, 1992: 162-163).

2.2 The vowel combination ia (1...).

Of specific interest in considering the possibility that ancient Arabic allowed an /ia/ [ ] vowel combination is the phenomenon of ‘inaula. By ‘inaula 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 ‘inaula are cases of contextually determined allophony. As noted earlier (Section 2.1), Sibawayh, for example, describes the pronunciation of ācabid 'worshipper' as [eːbɪd] or similar (Sibawayh, 1982: 117; cf. Nassir, 1993: 93), where the [eː] vowel is purely the result of the realisation of the /aa/ phoneme sequence in the context of /iː/, and where there seems to have been no question of a contrast between two forms [eːbɪd] and [eːːbɪd]. 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 āːxa."supper" (given in Sibawayh as مكة), and maka "pit of an iguana" (given in Sibawayh as مكة), where Sibawayh describes the final 'a' as being pronounced with ‘inaula (Sibawayh, 1982: 119). Al-Nassir suggests pronunciations [eːxaː] and [makaː] respectively (al-Nassir, 1993: 96). Sibawayh links the obligatoriness of the pronunciation with ‘inaula to the fact that these words have a final root letter waː', they are مكة يتكون إملاءة (Sibawayh, 1982: 119, 120). He also contrasts this with the optionality of ‘inaula (وقد يتكون إملاءة) in cases such as āːxa "stick", where the final root letter is waː (ibid: 120). If this analysis is correct, it implies that the ‘inaula 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 مكة مكة [eːxaː] vs. مكة [eːːxaː], where the former did not admit of a non-velarised variant (cf. English "dual" and "jewel" which are
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 'imazal by the Hijazis. These include xawab "he feared", pabub "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 'imazaz in any case" (Rabin, 1951: 111) of the normal contextually determined kind. That is to say, the 'imazal 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 'imazal 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 qawam "he got up" and ekeer "he [lit] turned" do not exhibit 'imazal (Sibawayh, 1982: 121). To reinforce the point, Sibawayh notes that some Hijazi speakers pronounce the word maza "he died" with 'imazal; the only people to do so, however, are those who also say mittu "I died".

[Translation]

If this 'imazal 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 /e/ phoneme, which he considers to derive from a rather controversial reconstructed proto-Semitic /e/ (Rabin, 1951: 110-114, 121; cf. Moscati et al., 1964: 46-47 for the doubtful nature of such a phoneme in proto-Semitic). This /e/ was thus attested in xawab, pabub, 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 xawab, pabub, haab type was the /i:/1.. combination. That is to say, in cases of the xawab, pabub, haab type, and possibly also in cases of the ciska, maka type, the deflection - 'imazal - 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 in Othman's model codex (Rabin, 1951: 112). Such spellings parallel spellings of the type حلَّوة which I have argued may have involved an /ua/ 1.. vowel combination. One can only guess at the precise phonetic realisation of the proposed vowel combination /i:/, but perhaps it was a diphthong starting at [i] and ending at [a], with an "averaged" pronunciation around [e:].
2.3 The vowel combination \( iu/iw \) (\( قی \)).

As far as I am aware there are no modern dialects of Arabic which exhibit the vowel combinations /ial/ or /ial/, 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/ (\( قی \)) in forms such as siwsiy \( \text{سوسیو} \) "chick". Other examples suggested to me by an informant are tihiwhiw \( \text{تهیوهو} \) "barking" (a verbal noun from \( hozho: \) "to bark"), and biwzn \( \text{بیوژن} \) "he weighs" (imperfect of \( wazan: \) "to weigh" with the bi- prefix; the forms boz\( \text{زین} \) and bawzn \( \text{بیوژن} \) 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 /ial/, 'imezala is of particular relevance in considering a possible vowel combination /iu/iw/ in Classical Arabic, in this case case 'imezala in the context of /u/w/. As with other cases of 'imezala, most cases of 'ima\( \text{اکله} \)ala in the context of /u/w/ in Classical Arabic seem to be examples of contextually determined allophony. Thus هذ\( \text{هذ} \) "scared" (Sibawayh, 1982: 143) for which al-N\( \text{اکله} \)asir suggests the realisation \( \text{ماعدونی} \) (al-N\( \text{اکله} \)asir, 1993: 102). In this case, the 'ima\( \text{اکله} \)ala 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 \( \text{یزی} \) "was given back" (the passive of \( خزی \) which appears in Sibawayh as \( خزی \) (Sibawayh, 1982: 118) and for which al-N\( \text{اکله} \)asir suggests the phonetic form \( [\text{ریددا}] \) (al-N\( \text{اکله} \)asir, 1993: 102). Sibawayh attributes this to the fact that من بیات الیاه \( \text{رید} \) (Sibawayh, 1982: 118). Al-N\( \text{اکله} \)asir translates this into the modern linguistic conception of "an underlying kasra" (al-N\( \text{اکله} \)asir, 1993: 102). I take it that Sibawayh is referring to the fact that sound verbs in the perfect passive have the pattern \( \text{تدا} \), i.e. there is a medial "i", and that the pronunciation of \( \text{زی} \) here reflects this. If this is the case, it would appear that \( [\text{ریددا}] \) here would be contrastable with a form such as \( \text{رید} \) "apostasy". It would also be contrastable with a form such as \( \text{زی} \) 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 \( \text{مذی} \) can in any case be reasonably substituted to support the potential phonological opposition. I also assume here that the realisation of taa' mar\( \text{اکله} \)a in pause was in fact \( [a] \), rather than \( [ah] \) (cf. Section 2.1).
is "كيف سيطر عليهم" "How did they come to be dominated?" (Abboud et al., 1983: 11).

Forms such as "rāyya" involve what is termed by Sibawayh and others 'išma'um, or yaa' bi-išma'um ad-dā'ima (Rabin, 1951: 119), which is taken to have the phonetic value [ʊ] by modern writers on the subject, e.g. Rabin (ibid.). Gaëtanna ([1978]: 194). As an example of 'išma'um, Gaëtanna quotes the form [quila] as a realisation of قيل "was said", the passive of قال (Gaëtanna, [1978]: 194-195; Howell, 1883: 1479). Rabin, citing the Līsān Al-ʿArab, also notes qīla for qīla 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/) قيل. 

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

<table>
<thead>
<tr>
<th>2nd vowel</th>
<th>/a/</th>
<th>/u/</th>
<th>/i/</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st vowel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/a/</td>
<td>/aa/</td>
<td>/au/</td>
<td>/ai/</td>
</tr>
<tr>
<td>e.g. حال</td>
<td>نوم</td>
<td>بيت</td>
<td></td>
</tr>
<tr>
<td>/u/</td>
<td>/ua/</td>
<td>/ui</td>
<td>/ii/</td>
</tr>
<tr>
<td>e.g. صالة</td>
<td>طول</td>
<td>فريل</td>
<td></td>
</tr>
<tr>
<td>/i/</td>
<td>/ia/</td>
<td>/iu/</td>
<td>/ii/</td>
</tr>
<tr>
<td>e.g. خاف</td>
<td>رود</td>
<td>فريل</td>
<td></td>
</tr>
</tbody>
</table>
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/ and /a/ would be considerably enhanced if the glottal stop /ʔ/ (corresponding to hamza - in Arabic script) could be coherently regarded as an allophone of /a/, since this would mean that /u/ /a/ 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 'الفاء' and 'هاء' as well as the Arabic script, in which 'هاء' most commonly has as its "bearer" 'الفاء' (i.e. /ʔ/ is written as /a/ or /æ/). Similarly, while 'هاء' and 'الفاء' are both counted as "letters" (حروف) by Sibawayh (1982: 431), only 'الفاء' is traditionally counted as one of the letters of the alphabet (အစား). Unfortunately, there are serious problems associated with an analysis of 'الفاء' and 'هاء' as allophones of a single phoneme, such as the presence of pairs such as /ba/ 'he began/came' and /ba/ '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).
REFERENCES.


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

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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.
The apical obstruents of Proto-Semitic.

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

<table>
<thead>
<tr>
<th>Corresponding alphabetic letter</th>
<th>Proto-Semitic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>tʰ (B,C)</td>
</tr>
<tr>
<td>1b</td>
<td>d (B,C)</td>
</tr>
<tr>
<td>1c</td>
<td>t' &gt; ?d &gt; d &gt; tʰ (B) &gt; tʰ (C)</td>
</tr>
<tr>
<td>2a</td>
<td>t⁰ &gt; θ (B) &gt; tʰ (C)</td>
</tr>
<tr>
<td>2b</td>
<td>d⁰ &gt; δ (B) &gt; d (C)</td>
</tr>
<tr>
<td>2c</td>
<td>?d⁰ &gt; d⁰ &gt; δ &gt; δ (B) &gt; d³/z⁵ (C)</td>
</tr>
<tr>
<td>3a</td>
<td>t³ &gt; s (B,C)</td>
</tr>
<tr>
<td>3b</td>
<td>d⁵ &gt; z (B,C)</td>
</tr>
<tr>
<td>3c</td>
<td>t³ &gt; s' &gt; s (B,C)</td>
</tr>
<tr>
<td>4a</td>
<td>ti &gt; l &gt; l (B,C)</td>
</tr>
<tr>
<td>4b</td>
<td>d₁</td>
</tr>
<tr>
<td>4c</td>
<td>ti' &gt; ?d₁ &gt; d₁ &gt; ₁ &gt; ₁ &gt; b₁ &gt; b₁ &gt; δ (B) &gt; d⁵ (C)</td>
</tr>
</tbody>
</table>

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).

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 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'i'] and [t'ε] 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 [t'i'] 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
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).

<table>
<thead>
<tr>
<th>Triad member</th>
<th>Degree of laryngeal tension</th>
<th>Glottal state</th>
</tr>
</thead>
<tbody>
<tr>
<td>voiceless</td>
<td>none</td>
<td>open</td>
</tr>
<tr>
<td>voiced</td>
<td>moderate</td>
<td>lightly closed</td>
</tr>
<tr>
<td>ejective</td>
<td>strong</td>
<td>firmly closed</td>
</tr>
</tbody>
</table>

**TABLE II. Glottal states and degrees of laryngeal tension associated with the Proto-Semitic obstruent triads.**
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 /ti/ is realised as a plosive in Cairene Arabic and a fricative in Baghdadi, and /θθ/ 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 I).* 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 \( /r\beta\alpha q\) (emphasis) Sibawayh says that \( /\eta/\) without \( /r\beta\alpha q\) 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 \( /\eta/\) 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 \( /\eta/\) that is like \( /\eta/\) 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 Sinā describes a \( /\eta/\) 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 (Martin, op.cit.,95), and there is no other emphatic in the series.

By contrast, the glottal opening in realisations of Cairene \( /\eta/\) 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 \( /\eta/\) and it seems reasonable to argue that this further weakening of laryngeal tension is at least partly due to the presence in the apical obstructant subsystem of \( /d/\) (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 /ð/ could not merge so readily with voiceless /t/ due to the incompatibility of their respective glottal states (if Arabic /t/ 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 /h/–/ã/ opposition from that attending the glottal states in the /h/–/ã/ 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 /h/ 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/ 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 [s'] 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 /j/, 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 /g/ but with a further stage of devoicing would be indicated. That its full history is a complicated one is indicated by the realisation of /z/ 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 opposition in Baghdadi Arabic, because of the presence of the voiced emphatic /ã/ deriving from the voiceless emphatic of series 2. The phonematic situation is equivalent to the result of Arabic /ã/ splitting into /ã/ and /z/, but historically it was not actually a phonemic split: /z/ seems to originate from 16th century
Ottoman pronunciations of Arabic /l/, although Bosworth points out how little is known about these (op.cit.:154, fn.4). He also quotes Landberg's observation that "ce ne sont que les Hâdar [town-dwellers] de la Syrie et de l'Egypte qui prononcent ːl comme un emphatique" (ibid.:157), i.e. as the emphatic correlate of /l/. A voiced contextually determined allophone of /s/ already existed in some varieties which Garbell sees as facilitating the introduction of /z/ as a phoneme (op.cit.:318). The appearance in the system of /z/ for identifiable sociolinguistic reasons thus post-dates the appearance of /q/ 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. /diddallim/ "to be made dark" vs. /tizzallim/ "to make a complaint", and /darab/ "to hit" vs. /zarab/ "to crap" (my thanks to James Dickins for these examples). Establishing /q/ as a phoneme entails the conclusion that its voicing is distinctive because of the presence of the voiceless emphatic /s/; the voicing of the cognate phoneme in Baghdadi Arabic - the interdental /ʃ/ - is not distinctive, there being no voiceless /ʃ/ in the system (although [θ̣] occurs as a contextually determined allophone of /θ/ in e.g. /θɔmontəʃa]/ (Al-Nassiry, 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 [ʃ̣]. 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 ʮ̣d" (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 [ð̣] in the aftermath of the Arab conquests (Bosworth, op.cit.:154-6). In those dialects which had preserved the interdental fricative series the
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.

\[
\begin{align*}
\theta & \rightarrow t \\
\delta & \rightarrow d \\
\bar{b} & \rightarrow \bar{d} \\
\bar{b} & \rightarrow \bar{d} \\
\theta & \rightarrow t \\
\delta & \rightarrow d \\
\end{align*}
\]

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 /l/. 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 /l/ in the words /tāhā/ 'to go astray', /fītāt/ 'scattered', /lāltīn/ 'a cook', /Χαττάτ/ '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 mašna ... bil-lusat al-inglīzja/ ("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 31 ms (speaker SK (Baghdad) for /ṭāhīn/), 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 /ḥ/ is of the order of twice that for /ḥ/, 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 /ḥ/ in the Baghdadi data is 12 ms with 81% of values falling within one SD, while that for /ḥ/ is 5 ms with 75% within one SD. The

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<td>tāḥa</td>
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<td>LM</td>
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<td>SK</td>
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<td>32-59</td>
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<td>15-31</td>
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</table>

**TABLE III.** Voice onset times for realisations of Baghdadi /ḥ/ and /ḥ/. The words are in the order as for speaker TR, with the values for the isolated form given first.
corresponding standard deviations for the Cairo data are 10ms (69% within one SD) and
14ms (63% within one SD). Spectrograms and speech waveforms of /täha/ and /tähin/
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 /t/ - 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

<table>
<thead>
<tr>
<th>CAIRO</th>
<th>AY</th>
<th>36-46</th>
<th>41-46</th>
<th>41-63</th>
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<td>38</td>
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<td>SW</td>
<td>16</td>
<td>16-31</td>
<td>24</td>
<td>15-44</td>
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<td>DR</td>
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<td>33-50</td>
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<td>LT</td>
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<td>21-29</td>
<td>18</td>
<td>18-36</td>
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<td>32</td>
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| TABLE IV. Voice onset times for realisations of Cairene /t/ and /t/. The words are in
the order as for speaker TR in Table III.

---

32
Fig. 2. Ranges and averages of VOT values for /h/ (dashed lines) and /f/ (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 /г/, 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 /d/ means this glottal state also has no distinctive function (see table V).

![Fig.3. Progressive weakening of intrinsic laryngeal tension in realisations of /г/ from Proto-Semitic to modern Cairene Arabic. Double arrows = strong tension, single arrows = moderate tension, broken arrows = weaker tension, no arrows = no tension.](image)

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 /q/ 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 ejective 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. /s/. 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 acquire distinctive function, and this situation has arisen in Cairene Arabic, so that the correlation of emphasis and the correlation of voice cross-classify in the phonemic structure giving the homologies /h://h/:/h/:/h/ and /s://s/:/s/:/s/; 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. 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 /h/ 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 /h/ is not distinctive, the distinctive feature "voiceless" is not shared in common between /h/ and /h/ 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/. The narrowed glottis and greater degree of laryngeal tension in realisations of /h/ 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); Marquis, (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 /u/ and /i/ 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).

<table>
<thead>
<tr>
<th>Voiceless</th>
<th>Voiced</th>
<th>Emphatic</th>
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<tbody>
<tr>
<td>/θ/ [θ]</td>
<td>/ð/ [ð]</td>
<td>/ð/ [ð³]</td>
</tr>
<tr>
<td>/tʰ/ [tʰ]</td>
<td>/d/ [d]</td>
<td>/tʰ/ [tʰ³]</td>
</tr>
<tr>
<td>/s/ [s]</td>
<td>/z/ [z]</td>
<td>/s/ [s³]</td>
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</tbody>
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TABLE V. Phonemes and principal allophones of the apical obstruent subsystem in Baghdadi Arabic (see Al-Ani, 1970:29).

<table>
<thead>
<tr>
<th>Dental stop</th>
<th>Unemphatic</th>
<th>Emphatic</th>
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<tbody>
<tr>
<td>Voiceless</td>
<td>/tʰ/ [tʰ]</td>
<td>/tʰ/ [tʰ³]</td>
</tr>
<tr>
<td>Voiced</td>
<td>/d/ [d]</td>
<td>/d/ [d³]</td>
</tr>
<tr>
<td>Dental fricative</td>
<td>Voiceless</td>
<td>/s/ [s]</td>
</tr>
<tr>
<td>Voiced</td>
<td>/z/ [z]</td>
<td>/z/ [z³]</td>
</tr>
</tbody>
</table>

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 /t/ 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 /tʰ/ and /tʷ/, lateral affrication for /t̪//. Early Arabic appears to have promoted the release features at the expense of the stop component in these three emphatics, but /t̪/ 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 Baghdad: /t/ 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 /d̪/ is most likely a phonetic development from complete glottal closure via laryngealisation whereas that in /b/ 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 /z/ 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.
AL (Baghdad): Speech waveform for /t/: left cursor marks release burst, right cursor marks voice onset.

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

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

Spectrogram of /ähl/ showing approximation of F1 and F2.
LM (Baghdad): Speech waveform for /a/: left cursor marks release burst, right cursor marks voice onset.

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

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

Spectrogram of /áám/ showing approximation of F1 and F2.
DR (Cairo): Speech waveform for /n/; left cursor marks release burst, right cursor marks voice onset.

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

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

Spectrogram of /ũa/ showing approximation of F1 and F2.
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 /t/ and /j/ at some point (Cantineau, 1941/1960:62-4).

3. Garbell notes that according to Feghali "the Turks actualized /o/ 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 Lehnh 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 (Shahen, 1979:87) - there may even be positions of neutralisation - but where the distinction is clear it justifies setting up the /t/ /d/ opposition as "voiceless": "voiced".
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EMPHASIS IN ŞANʿĀNĪ ARABIC.

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0. Introduction.

In this paper I consider the phonological effects of emphasis in Şanʿānī Arabic. In Şanʿānī Arabic emphasis has two or three articulatory correlates: pharyngealization - velarization and labialization (also termed labialization). With the traditional emphatics, š, š, and ḍ, pharyngealization and labialization co-occur, and both of the phenomena, but more strikingly labialization, 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 labialization. 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. qīmah for qīmah ‘price’, sūq for sūq ‘market’, cf. Greenman, 1979 for Central Tihāmī Arabic, Behnstedt, 1985:50, also on short ā in Baraddūn dāgūtat for dāgūtat ‘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 yufruh ‘he hits’, yiguṣṣ ‘he cuts’ yirṣaf ‘he puts out’, cf. Goitein, 1970:xvi, and Qafisheh, 1992:66 for Şanʿānī; Bettini, 1985:121 for Baraddūn; also examples in Rossi, 1939). In Şanʿānī, verbs of the pattern faṣal in the perfect usually have an emphatic consonant or a velar consonant in the root (as in ṣuṣ ‘to become thirsty’, waṣal ‘to arrive’, ḍanḥak ‘to laugh’, muṭur ‘to rain’, ṣuṭus ‘to sneeze’ kubur ‘to become big’, kuṭur ‘to become many’; cf. Qafisheh, 1992:44, and Goitein, 1970:xvi.
1960:366). In some dialects short high vowels are invariably realised as \( \upsilon \) in the immediate environment of emphatic consonants (as in the Iraqi names nāğum and kāğum).

In Sāmāni Arabic, labialization 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. \( اخا\) is realised as \( اخا\) 'good i.s.'
   \( اخ\) is realised as \( ا\) 'hammer f.'
   \( ا\) is realised as \( ا\) 'story f.'
   \( ا\) is realised as \( ا\) 'they f., drum'
   \( ا\) is realised as \( ا\) 'he cleans them f.'
   \( ا\) is realised as \( ا\) 'I am spending them f.'
   \( ا\) is realised as \( ا\) 'remembering m.s.'

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

2. \( ا\) is realised as \( ا\) 'he goes home'
   \( ا\) is realised as \( ا\) 'he cleans'
   \( ا\) is realised as \( ا\) '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 quadrilateral final weak verbs:

3. \( ا\) is realised as \( ا\) 'he cleans'
   \( ا\) is realised as \( ا\) 'he cleans'

In certain words, the sounds \( e \) and \( \dot{g} \), but apparently not \( h \) or \( x \), may also induce labialization of high vowels to the right or left of the emphatic:

4.1 \( ا\) is realised as \( ا\) 'fourth'
   \( ا\) is realised as \( ا\) 'seventh'
   \( ا\) is realised as \( ا\) 'tomorrow'

4.2 \( ا\) has a variant \( ا \) 'wedding'
   \( ا\) has a variant \( ا \) 'he suckles'
In most cases, however, the dominant laryngeal feature of the pharyngeals ġ and ħ overrides the prolabilial feature, particularly before the feminine ending -ih and after the imperfect prefix yi-

5. ʕātiḥah
maṣniḥih
thwē
is realised as
is realised as
is realised as
‘opening’
‘made it’
‘it I contains’

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

6. ǧub(u)kai
yishūh
is realised as
is realised as
‘she laughs’
‘he becomes’

2. Prolabial prosody.

Long-distance prolabilialization of high vowels, such as in the examples ṭayyub, ḥagūh ‘window’, ḥayn-agūhun etc., where the high vowel is not immediately adjacent to the emphatic consonant appear problematic - as transcribed here, the suggestion is that prolabilialization is ‘switched off’ after the emphatic then ‘switched on’ for the high vowel. Spectrographic analysis of the near-minimal pairs mistadīrīth ‘round I’ and mistadīfūh ‘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 prolabilial prosody. Prolabilialization is weak before the emphatic consonant, and strong following the emphatic. Consider the following text. Words in which prolabilialization is evident are highlighted in bold:

madāʾah 1a-t-tadsīn, kull wāḥid yī-rafhā fī l-yaman, hāḏa l-madāʾah bi-ṣakl gašābūh ḥākuḏa jāwiluh wa-min nāzīl ʿalā ṣakl kurīh, ʿalā ṣakl al-jawzīh jāvz al-hīnd hāḏa wa-bi-tkān mārkūḏīh ʿalā jāllūs, al-jāllūs ʿa-ykūn ṣaḥn mālāwwar aw yikūn bi-ṣakl allī hū mawjūd mīfi fi l-madāʾah, bi-ṣakl mīj-dājī ḥākuḏa, ... al-madāʾah māṣūʿah min al-kōbah, wa-fi l-madāʾah ṣubʿīn hāḏa, ʿalā-mā gulṭ umā gabl ṣwāyyih innaḥū bi-ṣakl al-jawzīh, jāvz al-hīnd. jāvz al-hīnd hāḏa aṣṭagīd innū ... bi-yīḥfūrūhā min ḍāxīl bi-yīḥfūrūhā yīxallawhā zayy al-kurīh, bi-hāḏa ṣ-ṣakl, buss mistadīrīh lā mistadīlūh, wa-min ṣān ṣahwī hāḏa l-kurīh hāḏa ʿaw nsanīhī tīnū l-jawzīh. al-jawzīh hāḏa ṣahwī al-māʾ.

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 Ṣanʿānī Arabic. Examples include:

8. ummī 'my mother' versus umnī 'illiterate'
   ummawak 'your m.s. mother' [agress.] unmak 'your m.s. mother' [non-agress.]
   mūn '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. šummī 'smell f.s.!'
   d̪əb′i 'fly'
   jubrā 'root'
   munkein '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
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 Şanlılı 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 / is pronounced as / as / 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 tongue is considered (Jakobson and Waugh, 1979:116). 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
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 stricture" (Harrell, 1957:69). And Catford reports that in two languages of the Caucasus - 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 u. The opposite feature, sharp, then distinguishes the palatalvelars i 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 (Hesselwood, p.e.): 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 Dickens 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-Salam al-Asri 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 emphatic where $i$ is found in words lacking emphatics:

<table>
<thead>
<tr>
<th>Turkish</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>tureq</td>
<td>roads</td>
</tr>
<tr>
<td>vidallah</td>
<td>beggar m.</td>
</tr>
<tr>
<td>bilwak</td>
<td>ponds</td>
</tr>
<tr>
<td>yihibbis</td>
<td>he dresses</td>
</tr>
</tbody>
</table>

3. For Lebanese, Haddad (1983) cited in Kenstowicz (1994:42) shows that when the root [rxr] ‘became cheap’ maps onto the CICG template a non-final $i$ is realised as [u]: $nus$s ‘became cheap’ versus $nus$s ‘became tender’ (from the root [rxr]).

4. This can be compared to the pharyngealization of labials $b$ and $m$ in Egyptian (Cairence) Arabic in words such as $bibi$ ‘pope’ versus non-emphatic $b$ in $bibi$ ‘month in the Coptic calendar’, $mama$ ‘mama’ versus non-emphatic $m$ in $hesama$ ‘dove’, and $mayyih$ ‘my water’ versus non-emphatic $m$ in $mayyih$ ‘my dead one’ (Harrell, 1957:74-75).

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

6. Perhaps the Arabic terms $mabag$ and $muraqqaq$ best capture emphasis in terms of articulation: $mabag$ (Sibawayh, vol. IV:436) ‘closed’ or ‘enclosed’ (Al-Nasir, 1993:50) gives the sense of a fairly large contained or enclosed resonator, while thebaseline or etymological sense of $muraqqaq$ entails ‘impotence’ and ‘standing’ and thus describes the ‘enlargement’ or ‘puffing out’ of the mouth resonator. The opposite of $muraqqaq$, $mabag$, 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/ly/ “tolly”, ho/y/lo “hello”, /yi/ty/ “light”, /y/iy/ “Lucy”, pici “please”, but as [w] in place of dark (i.e. velarized) $l$, e.g. paw/l “paw”, pov/w/ “Paw”, bo/w/ “bull”, be/w/ “boll”, scentry/w/ “Samuel”.

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