THE SEMIVOWEL ɣ̈ IN VIETNAMESE AND MANDARIN

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In 1948, Y. R. Chao[1], and only last year, Professor F. K. Li[2], whom we are honouring in this volume, discussed the voiced velar fricative or semivocalic constriction which characterizes the so-called "zero initial" in Mandarin. They have shown that it is not only recognizable phonetically but must also be distinguished phonologically from a true zero initial which occurs in the enclitic particle *-a*. The recognition of a similar velar semivowel occurring in other positions, structurally parallel to palatal *i* and labial *u*, will help to solve a number of problems that have made difficulties in the analysis of Mandarin phonology.

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Before considering the specific problems of Mandarin, however, it will be helpful to see how such a semivowel fits into the phonological patterns of Vietnamese. In Vietnamese there is a vowel, spelt *uᵓ* ("*u* barbu") in the Quô'c ngũᵓ romanization, for which E. J. A. Henderson[4] gives the phonetic value [ɯ] (R. B. Jones[5] has [I]). It forms a neutral, or back-central, counterpart to *i* and *u*, occurring both as a syllabic, alone or before final consonants, and in the combination spelt *uᵓaᵓ/uᵓoᵓ-*, pronounced [ɯə], parallel to the combinations *ua/uô-* [uə] and *ia/iê-* [iə]. A considerable simplification can be be achieved if we regard it as a realization of a phoneme /ɨ/ parallel to /i/ and /u/ in other respects as well.

In the structural analysis here proposed for the Vietnamese vowel system the following elements are postulated: (a) two degrees of tongue height, or relative closeness, /ə/ and /a/, (b) palatal, labial and velar (or front, back-rounded and central-back-unrounded) modifications /i/ /u/ /ɨ/. Either /ə/ or /a/ must be present in the structure of each syllable and they may be called the "vowels" proper. Though they may be combined with the modifications, they can never combine with each other. In other words, they represent a binary polar opposition, one and only one term of which is necessarily realized in every syllable. It must be emphasized that as phonological elements /ə/ and /a/ represent *relative*, and not *absolute* values. In one syllabic type the close term is reduced to zero,

being realized as the syllabic form of the preceding semivowel (i.e. modification). In such conditions the open term is realized phonetically as half-close [ə]. In other syllabic types the close term is realized as [ə] and the open term as [a]. In both cases the opposition in relative terms remains the same.

The modifications, on the other hand, may be called "semivowels" because: (1) they cannot occur (structurally) alone but must be combined with one of the degrees of closeness, /ə/ or /a/, in order to form a syllable, (2) they have features which link them with consonantal phonemes. This is clear enough in the case of /i/ and /u/, which have consonantal forms /w/ and /j/ occurring both alone and in combination with other consonants at syllabic boundaries. Both /w/ and /j/ occur in final position and before final /ŋ/ and /k/. /w/ occurs in combination with many initial consonants, including the "zero" initial which may have a glottal stop. There is no /j/ in the system of initials in North Vietnamese (unless we regard the palatal initials *ch* and *nh* as phonemically /kj/ /ŋj/ or /tj/ /nj/)[6]. In South Vietnamese, however, the initials spelt *đ* and *gi* are pronounced [j˺], *v* is pronounced [bj] or [j] and *x* is pronounced [s] or [sj].

The question of a consonantal form of /ĭ/ is more difficult. Vietnamese has a voiced velar fricative *g* [ɣ] as initial but it is a strong fricative, quite unlike the weak friction in the Mandarin "zero" initial. The "zero" initial in Vietnamese may have a glottal stop but I have no information as to what sort of boundary marker is found when this is absent. There is no contrast, at any rate, between syllabic and non-syllabic forms of /ĭ/ within a syllable, as there is between /u/ and /w/, /i/ and /j/. As will be seen below, I wish to posit /ĭ/ in final position in certain cases but I shall simply write ĭ.

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Though I am not concerned here with the consonantal system of Vietnamese, I give below a table of the initials in Quô'c ngũ˃ spelling, together with their modern pronunciation in North and South Vietnamese as given by E.J.A. Henderson. Where only one value is given, it is the same for both dialects.

VIETNAMESE INITIALS

Stop	Aspirate or Voiceless Fricative	Voiced Fricative or Continuant	Nasal

Laryngal or	o	*h*		
Glottal	[ʔ]	[h]	[o]	
Velar	*c,k,q*	*kh*	*g,gh*	*ng, ngh*
	[k]	[x]	[ɣ]	[ŋ]
Palatal	*ch*	*x*	*gi*	*nh*
	[c] SV.	[s(j)] SV.	[(ɣ)j][6] SV	[n]
	[ch] NV.	[s] NV.	[z] NV.	
Alveolar	*đ*[7]		l	*n*
	[ɗ]		[l]	[n]
Retroflex	*tr*	*s*	*r*	
	[tɪ] SV.	[ʃ] SV.	[ɻ] SV.	
	[ch] NV.	[s] NV.	[z] NV.	
Dental	*t*	*th*	*d* [j]SV.	
	[t]	[th]	[z] NV.	
Labial	*b*	*ph*	*v*	*m*
	[ɓ]	[ph] SV.	[(b)j] SV.	[m]
		[f] NV.	[v] NV.	

Labial initials never occur before [w]; nor do *r*, or *gi*. There is considerable difference in the frequency with which other initials do so and the picture would be greatly altered by the elimination of Sino-Vietnamese borrowings.

The arrangement in the table is to some degree a hypothetical reconstruction of the system that may be presumed to underlie the Quô'c ngû[5] orthography and is only partially valid for the present day in either Northern or Southern dialect.

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The table below gives structural formulas for all the possible finals of Vietnamese, together with their pronunciation in North and South Vietnamese as given by E.J.A. Henderson (disregarding the tones, which are not relevant to this discussion, and, as noted above, treating /w/ before the nucleus as part of the initial). It will be seen that North Vietnamese has distinctions corresponding nearly one for one to those of the Quô'c ngũ[5] romanization, almost the only exception being that *i* and *y* are both pronounced [i]. South Vietnamese, on the other hand, which preserves the initial distinctions better in some cases, has merged many finals. Some aspects of the way in which this has happened and its implications for the phonology will be discussed below.

VIETNAMESE FINALS

	/əɣ̯/	/ɨəɣ̯/	*/əɨ̯ɣ̯/	/ɨəjɣ̯/	/əɨ̯jɣ̯/	/uəwɣ̯/	/əwɣ̯/		
	ăng	*u͡ơng*	**o͡ơng*	*inh*	*ênh*	*ưng*	*ông*		
NV.	[əɣ̯]	[ɯɣ̯]		[ɨiɣ̯]	[ëiɣ̯]	[uɣ̯m͡]	[ɛuɣ̯m͡]		
SV.	[ɯɣ̯]	[ɯɣ̯]		[in]	[i̯n, ən]	[uɣ̯]	[auɣ̯m͡]		
	/aɣ̯/	/ɨ̈aɣ̯/	/aɨ̯ɣ̯/	/iaɣ̯/	/aɨ̯jɣ̯/	/uaɣ̯/	/awɣ̯/	/aiɣ̯/	/auɣ̯/
	ăng	*u͡ơ͡ơng*	*ang*	*iêng*	*anh*	*uông*	*ong*	*cng*	*oong*
NV.	[an]	[ɯəɣ̯]	[a:ɣ̯]	[iəɣ̯]	[ëiɣ̯]	[uəɣ̯]	[auɣ̯m͡]	[ɛɣ̯]	[ɔɣ̯]
SV.	[aɣ̯]	[ɯəɣ̯]	[a:ɣ̯]	[iɛɣ̯]	[ɐn]	[uɛɣ̯]	[auɣ̯m͡]	[ɛəɣ̯]	[ɔɣ̯m͡]
	/ək/	/ɨək/	*/əɨ̯k/	/ɨəjk/	/əɨ̯jk/	/uəwk/	/ɔwk/		
	âc	*u͡ơc*	**o͡ơc*	*ich*	*êch*	*uc*	*ôc*		
NV.	[ək]	[ɯk]		[ɨik]	[ëik]	[ukp͡]	[əukp͡]		
SV.	[ʌk]	[ɹ̩k]		[i̯t]	[i̯t,ət]	[uk]	[aukp͡]		
	/ak/	/ɨ̈ak/	/aɨ̯k/	/iak/	/aɨ̯jk/	/uak/	/awk/	/aik/	
	ắc	*u͡ơ͡ơc*	*ac*	*iêc*	*ach*	*uôc*	*cc*	*cc*	
NV.	[ak]	[ɹ̩ək]	[a:k]	[iək]	[ëik]	[uək]	[aukp͡]	[ɛk]	
SV.	[ak]	[ɯək]	[a:k]	[iək]	[ɛt]	[uən]	[aukp͡]	[ɛək]	
		/ɨə̯ɸ/	/ə̈/	/iəɸ/	/əiɨ̯/	/uəɸ/	/əuɨ̯/		
		u͡ơ	*o͡ơ*	*i,y*	*ê*	*u*	*ô*		
NV.		[ɯ]	[ɤ]	[i]	[e]	[u]	[o]		
SV.		[ɯ,ɤ̽ɯ]	[ɤ,ʌɤ]	[i,Ii]	[e,ei]	[u,ʊu]	[o,ou]		
		/ɨaɸ/	/aī/	/iaɸ/	/aiɨ̯/	/uaɸ/	/auɨ̯/		
		u͡ơa	*a*	*ia*	*e*	*ua*	*o*		
NV.		[ɯə]	[a]	[iə]	[ɛ,ɛə]	[uə]	[ɔ,ɔə]		
SV.		[ɯə]	[a]	[iə]	[ɛ]	[uə]	[ɔ]		
	/ən/	/ɨən/	/əɨ̈n/	/iən/	/əin/	/uən/	/əun/		
	ân	*u͡ơn*	*o͡ơn*	*in*	*ên*	*un*	*ôn*		
NV.	[ən]	[ɯn]	[ɤn]	[in]	[en]	[un]	[on]		
SV.	[ʌɣ̯]	[ɯɣ̯]	[ɤɣ̯]	[i̯n]	[ən]	[un]	[oŋ]		
	/an/	/ɨan/	/aɨ̈n/	/ian/	/ain/	/uan/	/aun/		
	ăn	*u͡ơ͡ơn*	*an*	*iên*	*en*	*uôn*	*on*		
NV.	[an]	[ɯən]	[a:n]	[iən]	[ɛn]	[uən]	[ɔn]		
SV.	[aɣ̯]	[ɯəɣ̯]	[a:ɣ̯]	[iəɣ̯]	[ɛəɣ̯]	[uəɣ̯]	[ɔɣ̯]		
	/ət/	/ɨət/	/əɨ̈t/	/iət/	/əit/	/uət/	/əut/		
	ât	*u͡ơt*	*ot*	*it*	*êt*	*ut*	*ôt*		

NV.	[ət]	[ɯt]	[ɤt]	[it]	[et]	[ut]	[ot]
SV.	[ʌk]	[ɯk]	[ɤk]	[ɨt]	[ət]	[uk]	[ok]
	/at/	/ïat/	/a¨t/	/iat/	/ait/	/uat/	/aut/
	ăt	*u͡o͡t*	*at*	*iêt*	*ɐt*	*uôt*	*ot*
NV.	[at]	[ɯət]	[a:t]	[iət]	[ɛt]	[uət]	[ɔt]
SV.	[ak]	[ɯək]	[a:k]	[iək]	[ɛək]	[uək]	[ɔk]
	/əj/	/ïəj/	/əïj/			/uəj/	/əuj/
	ây	*u͡i*	*o͡i*			*ui*	*ôi*
NV.	[əi]	[ɯi]	[ɤi]			[ui]	[oi]
SV.	[ɨi]	[ɯi]	[ɤi]			[ui]	[oi]
	/aj/	/ïaj/	/aïj/			/uaj/	/auj/
	ay	*u͡o͡i*	*ai*			*uôi*	*oi*
NV.	[ai]	[ɯəi]	[a:i]			[uəi]	[ɔi]
SV.	[a:i]	[ɯi]	[a:i]			[ui]	[ɔi]
	/əm/	*/ïəm/	/ə¨m/	/iəm/	/əim/	/uəm/	/əum/
	âm	**u͡m*	*o͡m*	*im*	*êm*	*um*	*ôm*
NV.	[əm]		[ɤm]	[im]	[em]	[um]	[om]
SV.	[am,ʌm]		[ɤm]	[im]	[em]	[um]	[om]
	/am/	/ïam/	/aïm/	/iam/	/aim/	/uam/	/aum/
	ăm	*u͡o͡m*	*am*	*iêm*	*ɐm*	*uôm*	*om*
NV.	[am]	[ɯem]	[a:m]	[iəm]	[ɛm]	[uəm]	[ɔm]
SV.	[am]	[ɯəm]	[a:m]	[im]	[ɛm]	[uəm]	[ɔm]
	/əp/	*/ïəp/	/əïp/	/iəp/	/əip/	/uəp/	/əup/
	âp	**u͡p*	*o͡p*	*ip*	*êp*	*up*	*ôp*
NV.	[əp]		[ɤp]	[ip]	[ep]	[up]	[op]
SV.	[ap, ʌp]		[ɤp]	[ip]	[ep]	[up]	[op]
	/ap/	/ïap/	/aïp/	/iap/	/aip/	*/uap/	/aup/
	ăp	*u͡o͡p*	*ap*	*iêp*	*ɐp*	**uôp*	*op*
NV.	[ap]	[ɯəp]	[a:p]	[iəp]	[ɛp]		[ɔp]
SV.	[ap]	[ɯp]	[a:p]	[ip]	[ɛp]		[ɔp]
	/əw/	/ïəw/	/əïw/	/iəw/	/əiw/		
	âu	*u͡u*	*o͡u*	*iu*	*êu*		
NV.	[əu]	[ɯu]	[ɤu]	[iu]	[eu]		
SV.	[au]	[ɯu]		[iu]	[eu]		
	/au/	/ïaw/	/aïw/	/iaw/	/aiw/		
	au	*u͡o͡u*	*ao*	*iêu*	*ɔo*		

NV.	[au]	[ɯu]	[a:u]	[iəu]	[ɛu]
SV.	[a:u]	[ɯu]	[a:u]	[iu]	[ɛu]

NV. = North Vietnamese. SV. = South Vietnamese. Forms marked * were regarded by Professor Henderson's informants as possible but not actually occurring. The rarely occurring finals spelt *ênng*, *êc*, *ôônng*, *ooc*, not admitted by Henderson, can be accommodated as /əiŋ/ /əik/ /əuŋ/ /auk/. So also, if it existed, one could accommodated *ôôc* as /əuk/, but none of the monographs or dictionaries that I have consulted quote such a form.

It will be seen that I divide the finals into nine types depending on the final consonant: /ŋ, k, ï or, o, n, t, j, m, p, w/. There are three nasals and three corresponding stops (velar, alveolar and labial) and correspondingly three types of "vocalic" finals. Leaving aside for the moment the small group of finals in /-jŋ, -jk, -wŋ, -wk/. there is a maximum of 14 syllabic types with each final consonant, seven with close nucleus /ə/ and seven with open nucleus /a/, namely: /ə/ [ə], /ïə/ [ɯ], /əï/ [ɤ], /iə/ [i], /əi/ [e], /uə/ [u], /əu/ [o], /a/ [a], /ïa/ [ɯə], /aï/ [a:], /ia/ [iə], /ai/ [ɛ], /ua/ [uə], /au/ [ɔ]. These can be summed up in the formulas: A, IA, AI, where A = the nucleus /ə/ or /a/ and I = any syllabic semivowel. It will be seen that the combinations IA are realized phonetically as [I] and [Iə], that is with the close variants of the vocalic nuclei. The combinations AI are realized as monophthongs — open or close depending on A, front, central-back, or back-rounded depending on I. In this they contrast with the phonetic diphthongs which result when A, IA or AI are followed by non-syllabic /j/ or /w/. The phonetic exponents of /əï/ and /aï/ are [ɤ] and [a:] respectively, longer and more retracted central vowels than given by /ə/ and /a/ alone. Final front and back vowels [e] [ɛ] [o] [ɔ] are accommodated as the form taken by AI [I = /i/ or/u/] before "zero". I write -ï in this case assuming that it has the phonetic effect of inhibiting the formation of a diphthong, which would otherwise be expected. In addition one may regard the offglide frequently found in the North Vietnamese realization of the finals *ê* [ɛə] and *ô* [ɔə] as an overt expression of the final semivowel.[8] It is possible that we should not posit /ï/ here but its nonsyllabic counterpart. It should be noted however that there is no contrast between finals *ơ*/əï/ [ɤ], *a* /aï/ [a:] and corresponding short finals, comparable to the contrast between *ây* /əj/ and ê /əiï/, *âu* /əw/ and *ô* /əuï/, etc. It looks therefore as if /ï/ in syllable final position has the same effect as when

followed by a consonant.

The finals spelt *-nh, -ch* require special consideration. If it were not for a few words in *cng, cc*, mostly onomatopoeic like *cng éc* "a pig's squealing" or loanwords like *kcng* "smart" (apparently from *américain*), the former would be in complementary distribution with finals in *-ng, -c*. Words in *oong*, with a pure [ɔ] vowel before final [ŋ], and lacking the assimilation of the final consonants to the preceding labial element which is implied by the simultaneous articulations [ŋ͡m] [k͡p], are still fewer in number and of the same type. Even more marginal are words, not included in the above table, with close [e] and [o] before unassimilated velar consonants, though Day[9] gives a few examples of spellings in *êc, êng, ôông*. If one could eliminate all such words, regarding them perhaps, with Professor Henderson, as belonging to a separate subsystem outside the main phonological system of the language, one could evidently treat *inh, ich, inh, ich, anh, ach, ung, uc, ônng, ôc, ong, oc* as structurally like *in, ên, cn, un, ôn, on*, etc., and regard the differences in phonetic realization— the presence of phonetic diphthongs and the palatalization and labialization of the final consonants — as environmentally conditioned.[10]

This complementation may well represent the historical situation but at a synchronic level it is difficult to exclude the disturbing "pure vowel" finals, especially those in *cng* and *cc*. (Professor Henderson finds the form *mêc*, in free variation with *mâch* "to relate, gossip", particularly puzzling.) A compelling argument against postulating structural identity for *anh* and *cn*, *ach* and *ct*, *ong* and *on*, *oc* and *ot*, etc., is provided by the way in which these finals are treated in South Vietnamese. In that dialect there has been a far-reaching interchange between final alveolars and velars. The finals spelt *nh* and *ch* have final [n] and [t], as have *ên, êt, in, it*. In all other cases both alveolars and velars give [ŋ] [k]. In particular *cn, ct* have not merged with *anh, ach* but have become [ɛəŋ] [ɛ̆ək], merging with *cng, cc*. Moreover *ôn, ôt, on, ot* have given [oŋ] [ok] [ɔŋ] [ɔk], remaining distinct from *ônng, ôc, ong, oc* which, in her material, have merged as [auŋ͡m] [auk͡p]. *un, ut* have merged with *ung, uc*, but as [uŋ] [uk] rather than [uŋ͡m] [uk͡p].

Although, therefore, I have placed *inh, ich, ênh, êch, anh, ach, ung, uc, ônng, ôc, ong, oc* in the /iə̯/ /əi̯/ /ai̯/ /uə̯/ /əu̯/ /au̯/ slots in the table and added *cng, cc, oong*, at the side, I posit differences at the phonological level and not merely in phonetic realization. I suppose that syllabic /i/ and /u/, in immediate

contact with final /ŋ/ and /k/, developed at some stage in their evolution non-syllabic [j] and [w] glides. (Note that though /iəŋ/ /iək/ /ueŋ /uək/ have a purely structural /ə/ intervening after the semivowel, this is realized as zero so that phonetically there is direct contact.) These glides would have been originally subphonemic but were at least potentially available to constitute a phonemic distinction, especially since they involved elements–nonsyllabic /j/ and /w/–which were present elsewhere in the phonological system. By now they must be regarded as phonologized.

Apart from the j element before the final consonants, the vowel qualities in *inh, ich, ênh, êch, anh, ach* are not the same as those of *i, ê, e* in other environments, but are more retracted or centralized. This difference is maintained in their reflexes in South Vietnamese [ɨn] [ɨt] [ən] [ət] [ɐn] [ɐt]. Note that this [ə] is distinct from the South Vietnamese value [ʌ] given by Miss Henderson for the vowel *ơ*. She describes the [ĭ, ĕ, ĕ] of North Vietnamese as "centralized vowels, slightly fronter than ɨ, ə, ɐ".[11] One might even treat these vowel distinctions in South Vietnamese as phonemic, since the velar and alveolar finals would then be very nearly in complementary distribution.[12] At any rate the phonemic distinction would seem to be a combination of vowel and consonant rather than depending on the consonants alone.

What we must assume to have happened is that lax, centralized variants of [i] [e] [ɛ] developed along with the palatal glide before ŋ and k. This is implied in Professor Henderson's phonetic transcriptions of North Vietnamese finals in *ch, nh*. In terms of the formulation here proposed, this can be accounted for by supposing that /i/, phonetically tense though not distinguished from a lax syllabic, /ĭ/, was resolved in front of /ŋ/ and /k/ into a lax syllabic /ĭ/ + non-syllabic /j/, the laxness of the syllabic part being a kind of compensatory shortening. The next stage was the shift of /jŋ/ and /jk/ to /n/ and /t/, which now left the short /ĭ/, giving /ĭən/ [ɨn] /əĭn/ [ən] /aĭn/ [ɐn] (and corresponding -t finals) in contrast to /iəm/ [im], /əim/ [em], /aim/ [ɛm], etc. Though redundancy was thus created, which one might surmise would lead to further phonetic change, "phonemicizing" it away may have doubtful validity.

Since *im, it, ên, êt* also develop these centralized vowels, possibly through an unattested stage in which they were [ĭjn] [ĭjt] [ĕjn] [ĕjt,] no distinction has appeared between tense and lax vowels before these consonants.

The emergence of the lax-tense contrast in syllabic forms of the semivowel

/i/ can be seen to have had further ramifications. We can attribute to it the diphthongization noted in the South Vietnamese pronunciation of finals *i* and *ê*: /iə/ = /ĭïə/ > /ïəj/ [ɨi]; /əiï/ = /əĭï̈/ > /əĭj/ [ei] (with loss of final ï). By analogy the lax-tense distinction extends to other semivowels in: *u* /uə/ = /ŭüə/ > /üəw/ [ʊu]; *ô* /əuï/ > /əŭw/ [ou]; *ư*ᵓ /ïəø/ > /ïə̯ï̯/ [ɤɯ]; *o*ᵓ /əï/ > /əi̯/ [ʌɤ].

Instead of merging with *anh, ach,* as one might have expected on the analogy of the corresponding close front finals in -n and -t, *cn* and *ct* have developed a diphthongal pronunciation [ɛəŋ] [ɛək]. These may be regarded structurally as /aiḭŋ/ /aiḭk/. The intrusion of the velar glide, however we suppose it to have first arisen, no doubt had the effect of definitely separating the final consonants from the palatal element in the vowel and ensuring a velar realization of the latter. At the same time the diphthongal finals [ɛəŋ] [ɛək] provide a front-central counterpart to the back diphthongs in [auŋ͡m] [auk͡p] and restore to a certain degree the symmetry that has been lost through the disappearance of the diphthongs in /aĭjŋ/ /aĭjk/.

By analogy with the development of /aiŋ/ /aik/ to /aĭjŋ/ /aĭjk/ one would expect that /auŋ/ /auk/ would have become /aŭwŋ/ /aŭwk/ (and so with the other /uŋ/ /uk/ finals). The phonetic values however point to /əwŋ/ /əwk/ /awŋ/ /awk/ for *ông, ôc, ong, oc,* that is to the /u/ element having gone over completely to non-syllabic /w/. In Professor Henderson's material the types with close and open nucleus have merged in South Vietnamese as [auŋ͡m] [auk͡p]. This may be compared to the treatment of the final *âu*, originally /əw/, in that dialect, where it has moved from [əu] to [au] (*au* /aw/ having become [a:u], merging with *ao* /a:w/). On the other hand the finals *ung* and *uc*, which merge with *un* and *ut* in the Southern dialect, do not show any sign of having a lax syllabic.

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Mandarin has no front or back pure vowel finals like Vietnamese *ê, e, ô, o*[13], so there is no need to differentiate such structures as /əj/ and /əiï/, where the final /ï/ was assumed to inhibit the formation of a phonetic diphthong with a closing palatal glide. We shall however wish to suppose an /ï/ after the nucleus in the finals ㄜㄛㄝㄚ (*e, o, a* in Gwoyeu romatzyh),[14] making them structurally parallel to diphthongs in /j/ and /w/. As in Vietnamess we need to postulate only types of nucleus, /ə/ and /a/. Note that /əï/ [ɤ] or [ɤʌ], is phonetically very similar to Vietnamese *o*ᵓ, for which we have postulated the same structure. The centralizing offglide, like that in North Vietnamese [ɛə] [ɔə], can be looked

upon as an overt realization of the semivocalic closure.

This structure immediately explains why, with the retroflex suffix, *gen* 根 "root" and *ge* 歌 "song" are distinguished: /kən + r/ =/kər/ "with a shorter and central vowel", /kəï + r/ = /kəïr/ "with a longer and back vowel").[15] This distinction is in the process of disappearing and for the younger generation of Mandarin speakers both words become /kər/. The corresponding distinction with open nucleus, as between 盤儿 /pᶜan + r/ = /pᶜar/ "tray" and 耙儿 /pᶜaï + r/ = /pᶜaïr/ "rake", has been alleged to exist for some speakers but may already be on the point of vanishing.[16]

There is however another distinction which seems clearly to be of the same nature, that is, between the sandhi form *tam* from *ta.men* 他們 "with an open and therefore more central and back *a*", and *tam* in *tam bu lai* for *tan bu lai* 怨不來 with "a fronted *a*". Evidently in the former case what we really have is /tᶜaïm/ from /tᶜaï + m/, while in the latter case we have simply /tᶜam/[17]

The sandhi of the particle 啊 *-a*/*-e* provides further examples of the need to suppose a final closure such as I have suggested in "vowel" endings. Since this particle has a true zero initial (apart from the linking /j/ in the variant form 呀 *ya*), the way in which it attaches itself to the preceding syllable will depend on how that syllable ends. In answer to my enquiry Professor F. K. Li kindly communicated some examples to me. He points out that the first vowel in 買啊 *mae-a*, which I would phonemicize as /maj + a/ = /maja/ is a fronted [a], not the same as that in 壓壓 *ia-ia* (/jaïjaï/) or 媽呀 (/maïja/). Similarly the first vowel in 薄啊 (/paw/ + /a/ = /pawa/) is not the same as that in 娃娃 (/waïwaï/) but has the back allophone [a] found in 薄 alone. 車啊 (/tʃᶜəï/ + /a/) either has the linking -j-, (in which case it does not become */tʃᶜəja/, which would imply the vowel in 給 *gei* /kəj/, but retains the back central vowel of the first syllable in isolation—hence /tʃᶜəïja/), or it has a linking [ɾ]. Since the latter cannot be attributed to the true zero initial of the particle, one either has to suppose that it is intrusive, like the linking -j-. or, more likely, that it derives from the final /ï/ of the first syllable.

The supposition of a final ï helps to explain another puzzle in Peking phonology mentioned by Chao, namely the combining forms of the pronouns 這 *jeh* /tʃəï/, 那 *nah* /naï/, etc. He notes that in a phrase like *jeh sh shoei* 這是水 "this is water", the first word can be pronounced either with the vowel [ɤ] which it would have in isolation or with "a more fronted, shorter [ə], as in the

final en".[18] This is evidently a case of the loss of the final ï when one grammatical word is closely linked to another. The same applies to forms like *jemme*, *nemme* (with, in the latter case, change of /a/ to /ə/). Loss of syllabic boundary markers between grammatical particles in frequent collocations is no doubt what has given rise to "fusion words" (e.g. 諸＝之於 or 之乎) throughout the history of the Chinese language.

Apart from its occurrence in final position, it will help to simplify the structure of Pekingese if we suppose a syllabic ï, phonetically rather like Vietnamese *uᵊ*. in syllables of the type 斯 *sy*, 詩 *shy*. These will then be parallel in structure to syllablef in *-i*, *-u* and *-iu* [y]. That is, they will have a syllabic semivowel before a close nucleus /ə/ (which reduces to zero in these circumstances) + zero final: /ïə/ /iə/ /uə/ /iuə/. One thing that makes it clear that one cannot simply suppose zero vocalism in this situation as Hockett did is the sandhi with the particle 啊 *-a*/*-e* (with true zero initial). /-ï(ə) + a/ maintains its close high vocalism. Though dissylabic in terms of Chinese structure, it gives something phonetically rather like Vietnamese *uᵊa*.

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So far we have not distinguished syllabic and non-syllabic, or tense and lax forms of the semivowels in Mandarin. We must do so however if we wish to use a similar rule to that found in Vietnamese concerning the realization of the close nucleus /ə/. In Chinese also it is sometimes phonetically [ə] and sometimes reduced to zero. If we assume that the latter takes place when it is preceded by a syllabic semivowel, we must distinguish /j/ and /i/, /w/ and /u/, and also /jw/ and /iu/. We shall have syllabic /i/ in /iə/ [i], /iəŋ/ [iŋ], /iən/ [in] but non-syllabic /j/ in /jəï/ [jɛ]; syllabic /u/ in /uə/ [u], but non-syllabic /w/ in /wən/ [wən] and /wəï/ [wɤ]

With final -ŋ we have [wəŋ] only with zero initial. Otherwise we have a vowel which Hartman transcribed as [ʊ],[19] Y.R. Chao describes it as an open *u* [ʊ] or [ᵒ] and in Gwoyeu romatzyh it is written with *o*, rather than *u*.[20] One will want to regard it as /uəŋ/, or, better, as /əuŋ/, as in South Vietnamese *ôn* [oŋ]. In favour of the latter solution is the fact that when prefixed by the palatal semivowel we do not get [y] or [ᶣ] but [jᵒŋ], implying /jəuŋ/, rather than /juəŋ/. There is nothing which absolutely forbids /juəŋ/ but, since /iu/ and /jw/ coalesce to [y] and [ᶣ], we might expect /ju/ to give at least [ʸu].

Hartman writes the same form [ʊ] for the vowel in the closer variant (1st

and 2nd tones) of *-iou*, which would also support /əuŋ/ against /uəŋ/.

We can use the difference between /i/ and /j/ to discriminate phonologically between the closer and more open variants of *-iou*. Though these are largely in complementary distribution with respect to tone, it has been shown that they can become minimally distinctive in conditions of tone sandhi, thus: 油井 *youjiing* "oilwells", which Chan transcribes as [iuˊt˺iŋ˨˩˦], where the first word has basic second tone, as opposed to *ycou jiing* "has a well", which Chao transcribes [iou˧˥tɕiŋ˨˩˦], where the first word has basic third tone.[21] This can be accounted for if we write /iəw/ in tones 1 and 2 and /jəw/ in tones 3 and 4, since we shall expect /ə/ to be much closer in the first case than the second according to our general rule. (Cf. Vietnamese *iu*) By analogy one will also distinguish the variants /uəj/ (tones 1 and 2) and /wəj/ (tones 3 and 4)

Before the more open nucleus /a/ one will want to posit only non-syllabic /w/ and /jw/. In the case of the palatal semivowel, however, one will wish to distinguish the non-syllabic forms in /jaŋ/ /jaï/ /jaj/ /jaw/ from the syllabic (or at least tenser) form in /ian/. This will account for the relatively closer vowel [iɛn] in the latter case, tending to merge with the allophones of /ə/ after /j/ and /jw/. A variant with more open [a] is said to exist, implying /jan/, perhaps a result of dialect mixture.[22]

When the retroflex suffix is added, /i/ before the nucleus become /j/ and /iu/ becomes /jw/: /iə/ /iən/ + /r/ > /jər/, /iəŋ/ + /r/ > /jəŋr/, /iəw/ + /r/ > /jəwr/, /ian/ + /r/ > /jar/, /iuə/ /iuən/ + /r/ > /jwər/. /u/ however is retained in /uəɕ/ + /r/ > /uər/ [ur] and /əuŋ/ (or /uəŋ/) + /r/ > /əuŋr/ (or /uəŋr/). But /uəj/ gives /wər/, not /uər/, implying a change of /u/ to /w/ before loss of final /j/. Note that /ïə + r/ gives /ər/, with loss of the semivowel.

Apart from the alternation of /iəw/ and /jəw/, /uəj/ and /wəj/, which correlates with tone, the syllabic and non-syllabic forms of /i/ /u/ and /iu/ are in complementary distribution in basic syllables (i.e. excluding those with -r suffix): /ia/ only before /n/, /iə/ before /n/ and /ŋ/, /iuə/ before and /n/, /uə/ before and /əu/ before /ŋ/ (except for zero initial); otherwise /j/ /w/ /jw/. With the retroflex final there is however a distinction between /uər/ [ur] and /wər/.

TABLE OF MANDARIN FINALS

ïə	əï	əŋ	əj	ən	əw	ər	əïr	əŋr	əwr
	aï	aŋ	aj	an	aw	ar	aïr(?)	aŋr	awr

iə	jəï	iəŋ		iən	iəw jəw	jər	jəïr	jəŋr	jəwr
	jaï	jaŋ	jaj	ian	jaw	jar	jaïr(?)	jaŋr	jawr
uə	wəï	wəŋ	uəj	wən		uər	wəïr	wəŋr	
		-əuŋ	wəj			wər		-əuŋr	
	waï	waŋ	waj	wan		war	waïr(?)	waŋr	
iuə	jwəï	jəuŋ		iuən		jwər	jwəïr		
				jwan		jwar			

Conclusion

The hypothesis of a non-palatal medial ï in Middle Chinese was put forward originally by the Japanese linguist Arisaka Hideyo[23] and a somewhat similar idea was developed by Lu Chih-wei.[24] This discussion of the role of such a phoneme in Vietnamese and Mandarin should help to clarify our understanding of its role in historical phonology also.

A further important result, in my view, is the vindication of the two-vowel hypothesis for Mandarin, which has seemed very attractive in terms of overall pattern but has suffered from various marginal difficulties. The hypothesis of a semivowel /ï/ and of syllabic and non-syllabic forms of /i/ and /u/ can very neatly dispose of most of these.

Some problems need further study, especially the proposal for a contrast between /iəw/ and /jəw/, /uəj/ and /wəj/. Experimental techniques might be of service here.

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The theory here developed of the Chinese and Vietnamese vowel systems, involving a sharp distinction between vocalic nuclei, on the one hand, confined to a two-way contrast in relative openness (ə/a), and labial, palatal and back-central or velar semivowels, on the other, related to labials, alveolar and velar-uvular consonants respectively, seems to be not easily reconcilable with the currently prevalent Jakobsonian theory of distinctive features, according to which the vowel triangle *a-i-u* matches the consonantal trio *k-t-p*. According to the theory developed here the missing term in the proportion *p:u::t:ï::k:*? is not the vowel of maximum aperture, *a*, but the semivowel ï. The *ə-a* contrast is a perfect binary polarity, but it operates in a different dimension from the consonantal classes.

If, as I hope to have shown, one can account for the vowel systems of

Vietnamese and Mandarin Chinese using the same restricted number of terms: open and close nucleus, three semivowels correlating with the system of final consonants and with the possibility of syllabic, tense and lax forms—it seems to point in the direction of a theory of distinctive features with their ultimate point of reference in articulation rather than in acoustics. This is what one would expect if acoustic features functioned, not as direct linguistic signals in themselves but, at least primarily, as clues to articulatory postures, enabling the hearer to reproduce the message internally for himself. But this is a large issue that cannot be entered upon here.

Notes to "The semivowel ĭ in Vietnamese and Mandarin"

1) Y. R. Chao, "The voiced velar fricative as an initial in Mandarin", *Le maître phonétique*, no. 89, (1948)

2) F. K. Li, "The zero initial and the zero syllabic", *Language* 42 (1966), 300-302.

3) For identifying Vietnamese words and parts of words I use the Quôc ngữ spellings. Formulas expressing the underlying phonology are placed between slant lines. Phonetic renderings are given in square brackets. As I have done no direct investigation of Vietnamese sounds, I depend for the latter on the work of others, especially the article by E.J.A. Henderson cited in note (4).

4) E.J.A. Henderson, "Towards a prosodic statement of Vietnamese syllable structure", *In Memory of J.R. Firth*, ed. by C.E. Bazell and others, London, 1966, pp. 163-197.

5) Robert B. Jones, Jr., and Huynh Sanh Thong, *Introduction* to *Spoken Vietnamese* Rev. ed., Washington, D.C., 1960.

6) Miss Henderson writes [j] but notes that there is strong friction in adagio speech which is not present in [j], spelt *d*. She is not responsible for the transcription [(ɣ)j], which I introduce to distinguish the two sounds.

7) đ [ɗ] and *b* [ɓ] are "glottalized but not implosive".

8) The variants with centering offglide appear to have a correlation with tone. Henderson, op. cit., footnote 20.

9) Arthur Colin Day, "Final consonants in Northern Vietnamese", *Transactions of the Historical Research Institute*, 3 (Saigon, 1962) pp. 6-7. A few words in *occ*, all clearly loanwords, are found in *Từ điển Việt Hán* 越漢辭典 Peking, 1966.

10) On this problem see also Murray B. Emeneau, *Studies in Vietnamese (Annamese) Grammar*, Berkeley and Los Angeles, 1951; Eugénie J. A. Henderson, "The phonology of loanwords in some Southeast Asian languages", *Transactions of the Philological Society*, (1951) 131-158, especially pp. 150-151; A.G. Haudricourt, "Les voyelles brèves du vietnamien", *Bulletin de la Société de Linguistique de Paris* 48 (1952) 90-93.

11) E. J. A. Henderson, work cited in n. 4, p. Note that Jones and Thong, op. cit., phonemicize these centralized vowels of South Vietnamese as /i/ /e/ /a/ respectively, (there being no contrast between [ɐn] [ɐt] and *[an] *[at]). So also Laurence C. Thompson, "Saigon

Phonemics", *Language* 35 (1959) 454-476. On the shortness of the vowels in the words spelled *ch, nh* see Haudricourt, op. cit.

12) Miss Henderson recognizes the short front-central vowels before consonants other than [n] [t] in a few cases where non-syllabic /w/ appears after the initial, namely: *uâm, oăm* [wəm] (North Vietnamese /wəm/ [wəm] and /wam/ [wam]), *uâc, uât* [wək], *uâng uân*, [wɨŋ]. This would point to a tendency to confuse allophones of /ə/ after /w/ with allophones of /əĭ/ and /ĭə/ and would introduce a minimal distinction based solely on the contrast between final [ŋ] and [n] in [wɨŋ] (<*uâng, uân*) and [wɨn] (<*uinh, uênh*—the spelling *uin* does not occur). Assuming the phonetic observations to be correct, this may have somethng to do with the "less stable occurrence of labialized initials" in the Southern dialect (Henderson, footnote 65) and a consequent tendency to make use of other means available in the system to preserve the distinctions dependent on labialization of the initial.

13) Except for the exclamations *è* 欸[ɛ] and *o* 哦[ɔ] which one could treat as /aiï/ /auï/, admitting exceptional structure rather than exceptional phonemes.

14) In citing Mandarin words and sounds I shall use characters or Gwoyeu romatzyh for identification purposes and the same conventions as above for phonological and phonetic transcriptions.

15) Y.R. Chao, *A Grammar of Spoken Chinese*, Berkeley and Los Angeles (1965) pp. 59, 64.

16) Y.R. Chao, op. cit. p. 66, n. 35.
L. M. Hartman, 3rd, "The segmental phonemes of the Peiping dialect", *Language* 20 (1944) 28-42, treated this distinction as a matter of length, /keer/ "songs" but /ker/ ,'roots" (without, however, regarding the vowel in 歌 /ke/ as long without the suffix). C. F. Hockett, "Peiping phonology", *Journal of the American Oriental Society* 67 (1947) 253-267, phonemicized my /kər/ as /keir/ and my /kəïr/ as /ker/ on the grounds that the vowel in the former was more fronted, the more plausibly because one source of it was /ei/+/r/. A. Rygaloff, "La phonologie du pékinois", *T'oung Pao* 43 (1955) 183-264, also took the distinction to be one of length, equating it with the distinction between the vowels in *tzy* and *tze* (which I regard as /tsïə/ and /tsəï/). S.E. Martin, "Problems of hierarchy and indeterminacy in Mandarin phonology", *Bulletin of the Institute of History and Philology, Academia Sinica* 29 (1957) 209-229, has long /e:/ for my /əï/ in isolation as well as when followed by /r/. He also uses it to deal with the problem of the closer and more open *iou* and *uei* diphthongs (regarding which, see below). K.V. Teeter and Kuang Mei, "A note on Mandarin phonology," *Language*, 42 (1966) 67-68, accept the existence of the /ar/ /aïr/ distinction and state rules for handling it in a generative framework, but while they succeed in stating the known (or supposed) facts quite succinctly, their solution to the problem amounts to saying that the qualities of *a* in *pan* and *pa* are different and these differences are maintained before *-r* or *-m*, without giving any linguistic reason why this should be so.

17) Chao, op. cit., p. 69. See also Martin, op. cit., pp. 219-220.

18) Chao, op. cit., pp. 66-67.

19) Hartman, op. cit., p.

20) Chao, op. cit., pp. 30, 32.

21) Chao, op. cit., p. 68. Cf Hockett, op. cit., p. 267, also "Peiping morphophonemics", *Language* 26 (1950) 63-85, p. 64.

22) Hockett, "Peiping morphophonemics", p. 64, Martin, p. 221.

23) Arisaka Hideyo 有坂秀世 "Karlgren-shi no yōonsetsu o hyōsu カールグレン氏の拗音說を評す", first published in *Onseigaku kyōkai kaihō* 音聲學協會會報 49 (1937), 51 (1938), 53 (1938), 58 (1939), reprinted in *Kokugo on'inshi no kenkyū* 國語音韻史の研究, 1944 (rev. ed., 1957), English translation by Kono Rokurō "A critical study of Karlgren's medial *i* theory", *Memoirs of the Research Department of the Tōyō Bunko* 21 (1962) 49-75.

24) Lu Chih-wei, "San ssu teng yü so-wei yü-hua 三四等與所謂喻化", *Yen-ching hsüeh-pao* 燕京學報 26 (1939) 143-173; see also *Ku-yin shuo-lüeh* 古音說略, *Yen-ching hsüeh-pao chuan-k'an* 20 (1947).

Additional notes:

1. The Vietnamese endings spelt *-nh*, *-ch* have more fronted [ŋ̟][k̟] in North Vietnamese than those spelt *-ng*, *-c*. For typographical reasons the diacritics by which Professor Henderson indicated this have been omitted in the table of finals on pp. 4 to 6.
2. An alternative and, I now think, preferable, solution to the problem of distinguishing Vietnamese *-anh*, *-ach* from *-enng*, *-ec* would be to regard the former as /aijŋ/ /aijk/ and the latter as /aiïŋ//aiïk/. In order to be consistent, one would then have to rewrite *en*, *et*, *em*, *ep*, *eo* as /aiïn/ /aiït/ /aiïm/ /aiïp/ /aiïw/, but in compensation for these longer phonological formulas, one would have everywhere a more exact correspondence between phonological structure and phonetic realization: /aiï/ = [ɛ, ɛe], /ai/ = NV [ɛ̆], SV [ɐ]. This also accounts more simply for the South Vietnamese development: *en* /aiïn/ > /aiïŋ/ [ɛəŋ]; *anh* /aijŋ/ > /ain/ [ɐn]. One would also rewrite *ô* as /eiï/ everywhere except before *-nh*, *-ch*; *o* as /auï/ and *ơ* as /əuï/ everywhere except before *-ng* and *-c*. *i* and *u* must also be rewritten as /iïə/ /uïə/ except before *-nh*, *-ch* and *-ng*, *-c* respectively. In South Vietnamese /əiï/ > /əij/, /iïə/ > /iəj/, /əuï/ > /əuw/, /uïə/ > /uəw/. In this way we can eliminate the need for distinguishing between tense and lax forms of syllabic /i/ and /u/ (/ĭ/ vs. /i/). There is only the contrast between tense, syllabic /i//u/ and lax, non-syllabic /j/ /w/.