

A CONTRASTIVE STUDY OF THE INITIAL, FINAL AND TONE OF THE AMOY AND FOOCHOW DIALECTS

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1. **Introduction.** Fukienese is known to dialectologists in China by the name of Min, the only group of Chinese dialects of which we have early records (ca. 1600) of two pronunciations: one literary and one colloquial. This group is further divided into four main groups, Northern, Southern, Western and Hinghua.¹ The Northern group is best represented by the dialect of Foochow; the Southern group by Amoy and Swatow. Between the dialect of Foochow and Amoy it has been estimated that the degree of mutual intelligibility is about ten percent. A practical result of this is that the Amoy and Foochow dialects have to be studied as if they are distinct languages.² Tung (1953:6) further indicates that their chief difference is that while there is only one set of final consonant (-ng, -k) in the North, there are four (-m, -p; -t, -n; -ng, -k; -ʔ, -0*) or three (-m, -p; -ng, -k; -ʔ, -0*) or at least two (-k, -ng; -ʔ, -0*) in the South.³ He, however, does not mention their differences in vowels and tones.

The aim of this paper is to gather sketches of the phonological structures of two Chinese dialects and to present the material in a manner allowing easy contrast of related features. I will begin by describing the phonological systems of the Amoy and the Foochow dialects and then make a systematic comparison of these two systems. The Amoy material used in this paper is taken from Lo (1930), Bodman (1955; 1958) and Tung (1958). The Foochow material comes from Chen and Norman (1965), Lan (1953) and Wang (1969).

2. **General Description:**

A syllable in Chinese phonology is traditionally illustrated as containing

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the following components:

tone		
(initial)	final	
	rhyme	
	nucleus (ending)	

In both literary and colloquial Amoy and Foochow dialects, a syllable may have no initial, but it always has a final and a tone. Syllables may be either open (or yinsheng-yun), i.e. ending in a vowel sound; or closed (or yang-sheng-yun), i.e. ending in a consonant sound. Medial is an optional glide. Nucleus is an obligatory component of a final.

2.2 Segmental Phonemes

2.2.1 Consonant Phonemes of the Amoy and Foochow Dialects

Symbols: IPA in red (right) for the Amoy dialect; IPA in black (left) for the Foochow dialect

/ / phonemic notation

[] phonetic notation

Place of articulation		Manner of articulation	Bilabial	Apico-dental	Dental-sibilant	Lamino-palatal	Velar	Glottal
			Stops	vl. asp.	/p'/ /p'/	/t'/ /t'/		
	unasp.	/p/ /p/	/t/ /t/			/k/ /k/	/ʔ/	
	vd.	[b]				[g]		
Affricates	vl. asp.			/c'/ /c'/	{tɕ'} {tɕ'}			
	unasp.			/c/ /c/	{tɕ} {tɕ}			
	vd.			[z]	{ʒ}			
Fricatives	vl.			/s/ /s/	{ɕ}	{x}	/h/ /h/	
	vd.							
Laterals	vd.		{l} /l/					
Nasals	vd.	/m/ /m/	/n/ /n/			/ŋ/ /ŋ/		

Remarks on the Consonant Phonemes:

A) In the Amoy dialect

- 1) All consonant phonemes: /p, p', t, t', k, k', ʔ, c, c', s, z, h, m, n, ŋ/ may occur initially, but only nasals and voiceless unaspirated stops may occur finally.
- 2) Seven stops are recognized in the Amoy consonants, namely /p, p', t, t', k, k', ʔ/; none of them is voiced. Except for the glottal stop /ʔ/, each of the stops is symmetrically paired by voiceless aspiration and voiceless unaspiration. /p, t, k/ in initial

position are strongly released, while in final position, they are unreleased. /ʔ/ is glottalization. It is phonemic finally but not phonemic initially because it is predictable before a vowel.

- 3) Each of /c/, /c'/, /s/ and /z/ has a palatalized allophone [tɕ], [tɕ'], [ç] and [ʒ] when followed by the high front vowel /i/. These palatalized sounds therefore should not be regarded as a separate phonemes.
- 4) The nasals /m, n, ŋ/ may occur initially or finally. If nasals are followed by non-nasalized vowels, [b, l, g] will substitute for /m, n, ŋ/ respectively. /m, ŋ/ can be syllabic as in the words m̄ 'don't, s̄ŋ 'sour'
- 5) The Amoy reflexes of the MC palatal nasal initial n_ɕ in Douglas's *Dictionary of the Vernacular or Spoken Amoy* were transcribed as j (i. e., dz). Later on, Lo (1930: 8) says that his informant mentioned, "a part of Amoy speakers follow Zhangzhou speakers and pronounce l as dz." So he decided to keep the phoneme dz in his analysis. Besides, Bodman (1958:3) indicates that "z has a sound like the j in jeep, when followed by i as is most often the case. Otherwise, it sounds like the ds in sounds or the dz in adze. However, many Amoy speakers lack this z and use l instead." In this paper, /z/, equivalent to Lo's /dz/, is a voiced unaspirated alveolar affricate.

6) Inventory of phonemes with their allophones

/p/ [p] in initial position e. g., /pâu/ 'a package'

[p⁻] in final position /câp/ 'ten'

/t/ [t] in initial position /tò/ 'to fall'

[t⁻] in final position /tĩt/ 'to get'

/k/ [k] in initial position /kĩ/ 'to point'

[k⁻] in final position /nâk/ 'six'

/ʔ/ occurs only after vowels; we don't count the /ʔ-/ before vowel, since it is predictable. It is optional in this position. e. g., /ǎʔ/ 'duck'

/p'/ e. g., /p'âu/ 'to gallop'

/t'/ e. g., /t'âk/ 'to read'

/k'/ e. g., /k'â/ 'foot'

/c/ [tɕ] before /i/ /cĩʔ/ 'tongue'

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	[c]	elsewhere	/càu/	'to run'
/c'/	[tɕ']	before /i/	/c'îŋ/	'thousand'
	[c']	elsewhere	/c'õ/	'mistake'
/s/	[ɕ]	before /i/	/sĩ/	'four'
	[s]	elsewhere	/sŋ̃/	'to count'
/z/	[zɛ]	before /i/	/zî̃t/	'day'
	[z]	elsewhere		
/m/	[m]	before nasal vowels, syllabic nasals, and in final position.		
			/mĩ̃/ 'noodle'; /mŋ̃/ 'hair'; /ciām/ 'temporarily'	
	[b]	before non-nasal vowels, e. g.,	/mān/ 'slow'	
/n/	[n]	before nasal vowels, syllabic nasals, and in final position.		
			/nĩ̃/ 'year'; /nŋ̃/ 'egg';	
			/pũn/ 'classifier for books'	
	[l]	before non-nasal vowels. The <i>l</i> sounds like a <i>d</i> or a <i>ʌ</i> . ⁴ e. g.,	/nĩ̃/ 'you (sg.)'	
/ŋ/	[ŋ]	before nasal vowels, syllabic nasals, and in final position. /ŋʒ̃/ 'five'; /mŋ̃/ 'door'; /ʔáŋ/ 'red'		
	[g]	before non-nasal vowels, e. g.	/ŋuà/ 'I'	
/h/ ⁵		e. g.,	/hóu/ 'river'	

B) In the Foochow dialect

- 1) There are fourteen consonant phonemes of which all may occur initially, but only /k/ and /ŋ/ occur finally in syllables.
- 2) Glottal stop is not indicated initially; since all syllables beginning with vowels are to be understood as having a glottal stop initials whenever they are pronounced after a pause.⁶ In the final position, glottal stop is written -k or -h, the difference between these two being morphophonemic.
- 3) The final -k tends to be glottalized. It is pronounced without explosion (unreleased). Nasal m, ŋ function as syllabics as well as initials.
- 4) /c/ and /c'/ exclusive of /s/ are palatalized when they occur before /i/ and /ü/.
- 5) Besides the 14 phonemes, there are three others: /v/, /z/ and /r/ which must be recognized as phonemically distinct. They occur

only intervocally.

6) Inventory of phonemes with their allophones.

/p/	e. g.	/pák/	'to beat'
/t/	e. g.	/tō/	'knife'
/k/	{k}	in initial position	e. g. /kî/ 'to point'
	{k ⁻ }	in final position	/ák/ 'duck'
/p'/	e. g.	/p'ĩ/	'nose'
/t'/	e. g.	/táu/	'head'
/k'/	e. g.	/k'ú/	'to squat'
/c/	{tɕ}	before /i, ü/	e. g. /cî/ 'word'
	{c}	elsewhere	/cǎ/ 'early'
/c'/	{tɕ'}	before /i, ü/	/c'ĩŋ/ 'deep'; /c'ü/ 'rat'
	{c'}	elsewhere	/c'ũŋ/ 'spring'
/s/	e. g.	/sũŋ/	'boat'
/m/		/mô/	'hat'
/n/		/nũ/	'you'
/ŋ/		/ŋĩ/	'ear'; /ũŋ/ 'yellow'
/l/		/lĩŋ/	'fish scales'
/h/	{x}	before /i, ü/	e. g. /hi/ 'that'; /hũŋ/ 'bear(n)'
	{h}	elsewhere	/hũŋ/ 'cloud'

2.2.2 Allophonic comparison between the Amoy and Foochow dialects

Amoy Allophones	Phonemes	Foochow Allophones
{p}, {p ⁻ }	→ /p/ ←	{p}
{p'}	→ /p'/ ←	{p'}
{t}, {t ⁻ }	→ /t/ ←	{t}
{t'}	→ /t'/ ←	{t'}
{k}, {k ⁻ }	→ /k/ ←	{k}, {-?} (traces of {-k ⁻ })
{k'}	→ /k'/ ←	{k'}
{c}, {tɕ}	→ /c/ ←	{c}, {tɕ}
{c'}, {tɕ'}	→ /c'/ ←	{c'}, {tɕ'}
{m}, {b}	→ /m/ ←	{m}
{n}, {l}	→ /n/ ←	{n}
{ŋ}, {g}	→ /ŋ/ ←	{ŋ}
	→ /l/ ←	{l}
{s}, {ɕ}	→ /s/ ←	{s}
{h}	→ /h/ ←	{h}, {x}

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[z], [z̥] → /z/

2.2.3 Vowel Phonemes of the Amoy Dialect.

	<u>oral</u>			<u>nasal</u>	
	Front	Central	Back		
	Unrounded	Unrounded	Round		
High	i		u	ĩ	ũ
Mid	e		o	ã	
Low		a	ɔ	ã	ɔ̃
Diphthongs					
(1) Oral:	ia,	io,	iu	(2) Nasal:	iã, iũ
	ai,	au			aĩ, aũ
	ui,	ue,	ua		uĩ, uã

Triphthongs

- (1) Oral: uai, iau
(2) Nasal: uaĩ, iaũ

Remarks on the Vowel Phonemes:

1. There is a difference in height between oral and nasal vowels. In general, the nasalized high vowels are lower than the non-nasalized high vowels.
2. Nasalized vowels are followed by final -ʔ only and usually occur in colloquial Amoy.

2.2.3.1 Inventory of vowel phonemes with their allophones

- /i/ [I] before ɔ, o, k, and ŋ, e.g., /iʃk/ 'benefit'; /kió/ 'bridge'; /k'ík/ 'crooked'; /kîŋ/ 'shoulder'
- [ĩ] before a, u and after all vowels except /u/. e.g., /nià/ 'a mountain range'; /iú/ 'grease'; /ǎi/ 'to love'
- [i] after u and consonants, e.g., /k'uî/ 'open'; /hí/ 'fish'
- /e/ [e] with initials, e.g., /mè/ 'horse'
- /a/ [a] before k and ŋ, e.g., /nâk/ 'six'; /sǎŋ/ 'send'
- before or after u, e.g., /tuǎ/ 'to carry'; /k'ǎu/ 'to cry'
- [ɛ] between i and n, e.g., /iân/ 'smoke'; /tián/ 'sweet'
- [a] elsewhere, e.g., /cà/ 'early'; /nāi/ 'inside'
- /o/ e.g., /hò/ 'good'; /sôî/ 'therefore'
- /ɔ/ e.g., /ŝ/ 'black'
- /u/ [v] after k and ŋ, e.g., /kûn/ 'towel'; /ŋuà/ 'I'
- [ṽ] before all vowels and after all vowels except /i/

- /uǎ/ 'late'; /k'uī/ 'open'; /kāu/ 'thick'
[u] elsewhere, e.g., /cù/ 'chief'
/ĩ/ e.g., /c'ĩ/ 'star'
/ē/ a rare phoneme, e.g., /ē-à/ 'a baby'
/ǎ/ e.g., /sǎ/ 'clothes'
/ǝ/ a rare phoneme, e.g., /ǝ/ 'the sound of a horn'
/ũ/ occurs only in diphthongs and triphthongs, iu, au, iau.
/hiũ/ 'country'; /iũ/ 'sheep'; /háũ/ 'to suspend'; /niãũ/
'cat'. iũ is a very common diphthong; but aũ, iaũ are
very rare vowel combinations.

2.2.3.2 Distribution of Phonemes--Amoy Syllable Types

In the Amoy Dialect, a syllable consists of at least one vowel segment (or a syllabic nasal) plus one tone. There is no sequence that consists of more than three vowels. No consonant-clusters and identical vowel sequence can be found. In this paper, the longest syllable, as in /ciãm/ 'needle' is of four segments. Any consonant is never preceded by three vowels. At present, all possible syllable types for Amoy can be listed as follows:

- a. (C₁) (V) (V) V
- b. (C₁) (V) V (C₂)
- c. (C₁)N (mostly used in colloquial Amoy.)
C₁=Initial consonants
C₂=Final consonants
N=syllabic nasals
(C) means the consonant is optional.
(V) means the vowel is optional.

2.2.3.2a Combination Analysis

- (1) Initial consonants (C₁)--With the exception of the glottal stop, all the consonant phonemes in the Amoy dialect may occur in syllable-initial positions. The following restrictions hold for the combination of initial consonants and vowels:
 - a. /z/ occurs only before oral vowels.
 - b. Only /p, t, k, m, n, s, h/ occur before syllabic nasals.
- (2) Vowels and final consonants (C₂)--Only *p, t, k*, (or ? in colloquial Amoy), and *m, n*, and *ŋ* may occur in syllable-final positions. The following restrictions hold for the combination

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of vowels and final consonants:

- a. Nasal m, n, ŋ and stops p, t, k do not combine finally with nasalized vowels, and they do not combine with triphthongs.
- b. The glottal stop combines finally with nasalized vowels, non-nasalized vowels, diphthongs and triphthongs.

- (3) Syllabic nasals (N)--If the syllabic nasal is m, the preceding consonant must be *h*, e.g., /h̄m/ 'a marriage go-between'. If the syllabic nasal is ŋ, then it occurs after all initials except *b-*, *l-*, *g-*, *ŋ-*. e.g., /m̄ŋ/ 'door'; /n̄ŋ/ 'egg'; /s̄ŋ/ 'sour'; /t̄ŋ/ 'long'

Within the limitations stated in Bodman (1955:168-9) and above, it is theoretically possible for any Amoy initial consonant to occur with any of the syllable types listed above. However, there are certain gaps in the total consonant distribution which may be accidental irregularities, or which may be structural features.

2.2.4 Vowel Phonemes of the Foochow Dialect.

The Foochow vowel phonemes are as follows:

	Front Unrounded	Front Rounded	Central Unrounded	Back Round
High	i	ü (y)		u
Mid	e	ϕ		o
Low			a	
Diphthongs: ia, ie, io, iu		Triphthongs: ieu, uoi, uai		
	ai, au, oi, ou			
	ei, eu			
	ua, uo, ui			
	ϕi, üo			

2.2.4.1 Inventory of vowel phonemes with their allophones

- /i/ [I] before *k*⁸, e.g., /m̄ik/ 'to drown'
- [i] before or after *a*, *e*, and *o*. e.g., /c'iā/ 'car'; /m̄ai/ 'to bury'
after *u* and *ϕ*, e.g., /siè/ 'snake'
- [i] elsewhere, e.g., /p̄iŋ/ 'poor'; /ī/ 'clothes'
- /e/ [ɛ] without finals, e.g., /è/ 'shoes'; /m̄ei/ 'riddle'
- [e] elsewhere, e.g., /t̄iēŋ/ 'sky'
- /ü/ e.g., /ŋ̄ü/ 'fish'
- /ϕ/ e.g., /l̄ϕ/ 'donkey'

/a/ [a]⁹ in yin-ping, yang-ping and shang sheng, e.g., /t'à/ 'tea';
/pã/ 'to satiate'

[A] in yin-qu and yang-qu, e.g., /mâ/ 'to sell' /tã/ 'emperor'

/o/ [o] in yin-ping, yang-ping and shang sheng, e.g., /mò/ 'hair';
/k'o/ 'O. K.'

[ɔ] in yin-qu and yang-qu, e.g., /cô/ 'soap'

/u/ [v] before k

[ɤ] before or after a, e, and o e.g., /huò/ 'and'; /puǒ/ 'cloth'

[u] elsewhere, e.g., /t'ù/ 'picture'

2.2.4.2 Distribution of Phonemes--Foochow Syllable Types

On the basis of the data listed in Chen and Norman (1965: Lesson 1-10), the longest syllable like Amoy is of four segments. Now, all possible syllable types for Foochow can be listed as follows:

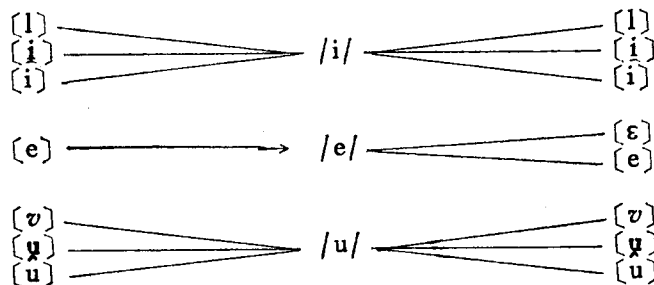
- a. (C₁) (V) (V) V
- b. (C₁) (V) V (C₂)
- c. N

2.2.4.2a Combination Analysis

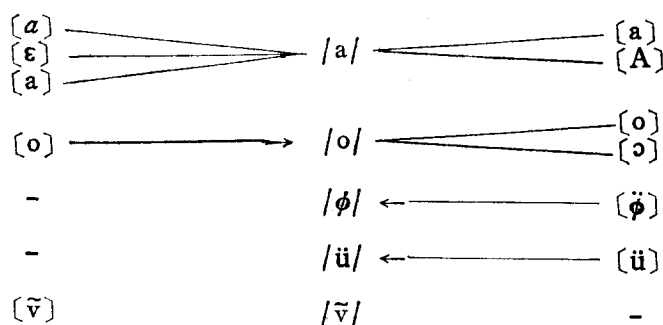
- (1) Initial consonants (C₁)--All the consonant phonemes in the Foochow dialect can occur initially.
- (2) Vowels and final consonants (C₂)--Vowels *i* and *u* automatically become glides before or after any vowel and serve as medials. Otherwise, like other vowels, they serve as nuclei. Only *k* and *ŋ* can occur finally.
- (3) Syllabic nasals (N)¹⁰--Unlike Amoy, no initial consonant can occur before the syllabic nasal. Only *ŋ* can serve as syllabic nasal in Foochow, e.g., /ŋ/ 'not'

2.2.5 Allophonic Comparison Between the Amoy and Foochow Dialects

Amoy Allophones Phonemes Foochow Allophones



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2.3.1 The Tone Phonemes. The Amoy and Foochow tones can be divided into two categories, namely basic forms and sandhi forms. The basic forms occur alone, before neutral tones, at the end of a sentence, at the end of a subject, at the end of adverbs (for time or place), at the end of compound nouns and adverbs (Cf. Tung 1958:243). We can say that basic tones occur immediately before these junctures: +, /, //, . (Cf. Bodman 1955:38). There are five tones with vowel and nasal finals and two with stop finals. We can also interpret Amoy and Foochow as having five phonemic tones. The two tones with stop finals are allophonic tones. This allophonic tone theory is first supported by Bodman (1955:3, 38) and then Cheng (1968). Sandhi forms occur other than in the above-mentioned positions, and their changes are according to the tone sandhi rules.

For the sake of easier comparison, I will use the five-point tonal scale proposed by Y. R. Chao to express pitch shapes of the tones. Tones are represented by Roman numerals corresponding etymologically to the four tones of Middle Chinese. The letter 'a' and 'b' stand for an historical split that corresponds to unvoiced and voiced initial consonants, respectively.

2.3.1a Basic tone in Amoy

The seven basic tones in Amoy are:

Tone category	Tone value	Tone mark	Example	Gloss
Ia (陰平)	55	∧	tō	'a knife'
Ib (陽平)	24	/	té	'to escape'
II (上聲)	42	\	tò	'to fall'
IIIa (陰去)	21	∨	tǒ	'to pour'
IIIb (陽去)	33	-	tō	'doctrine'

IVa (陰入)	32	∨	tōʔ	'table'
IVb (陽入)	5	∧	tôʔ	'to kindle'

Among the seven tones, IVa and IVb are different from others not only in the length of pitch, but also by the characteristic presence of the consonants *p*, *t*, *k*, *ʔ* in syllable-final positions.

2.3.1b Tone Sandhi in Amoy

In words or phrases of two or more syllables, the last syllable generally retains its original tone, the other syllables change to other tones. The following examples with the syllable /to/ will illustrate tone sandhi in two-word phrases.

tô	'a knife'	tō muě	'the end of a knife'
tó	'to escape'	tō pīn	'deserter'
tò	'to fall'	tô c'iu	'fallen trees'
tō	'to pour out'	tò cui	'to pour water'
tō	'doctrine'	tō t'ik	'moral'
tōʔ	'table'	tò mīn	'the surface of the table'
tôʔ	'to kindle'	tō niău	'be burned to ashes'

The tone sandhi above can be shown by the following tentative table:

Non-stops	Non-stops	Stops	Stops
Basic Forms	Sandhi Forms	Basic Forms	Sandhi Forms
Ia (55) (∧)	→ IIIb (33) (—)	IVb (5) (∧)	→ IVa (32) (∨)
Ib (24) (∕)	→ IIIb (33) (—)	IVa (32) (∨)	→ IVb (5) (∧)
IIIb (33) (—)	→ IIIa (21) (∨)		(for -p, -t, -k only)
IIIa (21) (∨)	→ II (42) (∖)	IVa (32) (∨)	→ II (42) (∖)
II (42) (∖)	→ Ia (55) (∧)	IVb (5) (∧)	→ IIIa (21) (∨)
			(for -ʔ and in tone sandhi -ʔ is dropped)

The rules for these tone changes may be represented by Bodman's tone circle (1955: 41).

The first syllable of a trihomophonic group (Lo 1930: 28), i.e., a trisyllable reduplication of homophones will not be discussed here.

2.3.2a Basic tone in Foochow. There are seven tones in the Foochow dialect.

Tone category	Tone value	Tone mark	Example	Gloss
Ia (陰平)	55	—	/mā/	'mother'
Ib (陽平)	51	∖	/mà/	'hemp'

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II	(上聲)	22	—	/ma/	'horse'
IIIa	(陰去)	21	∨	/mǎ/	'to scold'
IIIb	(陽去)	342	^	/mâ/	'don't know how'
IVa	(陰入)	24	/	/éik/	'one'
IVb	(陽入)	55	—	/māk/	'wheat'

Among the seven tones, IVa and IVb end in a glottal stop when pronounced in isolation (indicated by /-k/ in this paper). Besides, IVa behaves in two different ways morphophonemically, so it is divided into two types: IVa' and IVa"; IVa' is written with a final /-h/, and IVa" with a final /-k/. (Cf. Lan 1953:263) Chen and Norman (1965: Lesson 1-12) use an additional tone (i. e. 8th tone) which occurs only as the result of sandhi.

2.3.2b Tone sandhi in Foochow

The tonal changes which take place in two syllable combinations are outlined a chart by Chen and Norman (1965: Lesson 2-7). I rearrange the chart as follows:

1st syllable \ 2nd syllable		陰平		陽平、	陽入、	上聲	陰去、	陽去、	陽入
		陰平、	陽去、	陰去、	陰入 (IVa")	陰平	陰平	陽平	陽平
陽平、	陽入	陰平	上聲	上聲	上聲				
上聲、	陰入 (IVa')	上聲	上聲	8th tone	8th tone				

From this chart, we clearly know that tone sandhi in Foochow is much more complicated than in Amoy. There is no doubt that the characteristic that most distinguishes the Foochow dialect is its tonal and consonantal morphophonemics, and also the changed vowels in certain tones.

2.3.3 Comparison of tone in these two dialects

Among the seven tones, both Amoy and Foochow have Ia, IIIa, and IVb; but I am reluctant to jump to the conclusion that they are equivalent

to each other. We should have recourse to instrumental investigation before making such a statement. One thing that is certain, however, is that they are rather close so far as the tone value is concerned. Amoy's IIIa is, in my opinion, lower than that of Foochow. As for IIIb, there is no counterpart in Amoy. Besides, no so-called 8th tone can be found in Amoy.

Notes

1. Bodman (personal communication).
2. Chen (unpublished paper, p. 2).
3. The symbol* used by Tung represents the dropping of final nasal consonant with the nasalizing of the preceding vowel.
Forrest (1965:244) also indicates that Min dialects fall into two subgroups, of which the North has lost the bilabial nasal as a final, while the South has kept it at least in some cases.
4. Bodman (1958:3) indicates that the Amoy *l* sometimes strikes the English ear as a *d* or an *n*.
5. Tung (1958:233) indicates that nasalized vowels are not consistently differentiated from non-nasalized vowels when they occur after the phoneme *h*. For example *hi* or *hĩ* 'ear'.
This is because it is hard to lower the velum to let the air through the nose, and at the same time let the air stream come out from the mouth. Furthermore, the quality of the phoneme /h/ is always influenced by the phoneme which follows it. For example:

/hŋ/	=	{ŋŋ}
/hm/	=	{mm}
/ha/	=	{aa}
6. Chen (1969:i)
7. Like T'ao (1930) and Kao (1947), Chen and Norman (1965: Lesson 1-5) say the *h* in the Foochow dialect represents a lenis velar spirant like the sound represented by the German *ch*; before *i* and *ü* it is fronted to the palatal position. I adapt T.C. Wang's analysis (1969:6) in which /h/ has two allophones: {h} and {x}.
8. T'ao (1930) indicates the tongue position of { $\begin{smallmatrix} i \\ u \end{smallmatrix}$ } before the ending *-k* is lower than { $\begin{smallmatrix} i/iŋ \\ u/uŋ \end{smallmatrix}$ }.
9. Lan (1953:248) says { $\begin{smallmatrix} a \\ o \end{smallmatrix}$ } has two allophones { $\begin{smallmatrix} a \\ o \end{smallmatrix}$ } and { $\begin{smallmatrix} A \\ ɔ \end{smallmatrix}$ }. { $\begin{smallmatrix} a \\ o \end{smallmatrix}$ } occurs in yin-ping, yang-ping and shang sheng, and { $\begin{smallmatrix} A \\ ɔ \end{smallmatrix}$ } occurs in yin-qu and yang-qu.
10. Some linguists like Yuan (1960:16) treat both *m* and *ŋ* as syllabic nasals

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in Foochow. However, up to now, I have been unable to supply an example for syllabic nasal *m*.

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