

Chao's "Distinctions Within Ancient Chinese" :
A Phonemic Re-Analysis of Karlgren's
Etudes sur la Phonologie Chinoise

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0. Introduction

Yuen Ren Chao's "Distinctions Within Ancient Chinese" appeared in the *Harvard Journal of Asiatic Studies* 5, 1941. As a jumping off point, Chao accepts most of Bernhard Karlgren's conclusions regarding the surface forms of Ancient Chinese, as presented in that author's *Etudes sur la Phonologie Chinoise* (1915-26). Chao's goal then, was not to drastically reconsider the posited phonetic values of Ancient Chinese as represented in the fanqie of the Qieyun riming dictionary. Instead, Chao was intent upon exploiting more recent developments in phonological theory, in particular the notion of phonemic distinctions, as posited by minimally contrasting forms, and phonemic identity, as posited by complementary distribution, in order to devise a phonological system of Ancient Chinese, including an underlying segment inventory as well as (non-formalized) phonological processes which acted to generate Karlgren's hypothesized surface forms.

Karlgren, it should be noted, employed primarily the fanqie of the Guangyun riming dictionary (601 C.E.), which is thought to be an attempt to reproduce Mandarin ChangAn Chinese of the Qieyun era (c. __), in addition to several somewhat later rime dictionaries and rime tables written with presumably the same intent. Karlgren additionally considered modern dialectal reflexes of hypothesized Ancient Chinese forms, as well as Sino-Korean, Sino-Japanese, and Sino-Vietnamese in his reconstruction. Unlike some other

researchers, Chao appears to have few qualms with Karlgren's investigative techniques, apparently accepting them in full. However, Chao, writing twenty years after Karlgren's pioneering work, had access to post-Karlgren research, which sometimes made reference to additional rime tables (for example, the *Yi Qie Qing Yin Yi*, reflecting a lost rime dictionary, *Yun Ying*), which for whatever reason, were not employed by Karlgren. Indeed, these sources provide compelling support for certain of Chao's hypotheses regarding underlying contrasts in Ancient Chinese.

Finally, it should be noted that, while Karlgren accepted all information in the *fanqie* and the rime tables at face value (sometimes resulting in extremely convoluted argumentation regarding apparent inconsistencies), Chao takes a more liberal approach, hoping to explain away certain inconsistencies by assuming the original compilers employed shorthand devices to represent particular contrasts, as well as assuming certain contrasts were the result of phonetically distinct forms representing underlying phonemic identity. This assumption is an intuitive one, as native speakers would presumably be more interested in accounting for phonemic contrasts rather than phonetic ones.

1. Pure and Yodized Initials

Table I presents Karlgren's ancient initials, displayed in a fashion best highlighting Chao's observations and consequent conclusions regarding underlying distinctions.

Table I

Labials		Pure	p	p'	b'					
		Yodized	pj	p'j	b'j					m
Dentals	Plosives		t	t'	d'					mj
	Liquids	Pure								n l
		Yodized								nj lj
	Sibilants		ts	ts'	dz'	s	z			
Palatals	Plosives		't	't'	'd'					
	Supradentals		ts	ts'	dz'	s				
	Sibilants		t's	t's'	d'z'	's	'z	n'z		
Gutturals		Pure	k	k'		X	v	ng	i	*
		Yodized	kj	k'j	g'j	Xj		ngj	j	*j

Karlgren hypothesizes an underlying contrast between pure and yodized (palatalized) initials within the labial, dental sonorant, and guttural (velar/glottal) classes. Chao claims that this contrast is not significant, and is in fact an artifact of "medial harmony" between qie uppers and lowers.

As shown in Table II, there seems to be a replication of medial yodization in the upper and lower qie of grade III.

The first table shows the cross-grade distribution of s vs. s^j main words versus lower qies, while the second table shows the distribution of l vs. l^j main words versus lower qies.

s vs. s^j

l vs. l^j

Chao notes that the lower qies are distributed within groups (grades I, II, and IV [non-yodized] vs. grade III [yodized]): grade III main words and lowers both tend to possess yodized elements, while non-grade III main words and qie lowers both tend to possess non-yodized elements.

Chao concludes that medial yodization, since neither strictly part of the initial nor strictly part of the final, tended to be represented with qies in which both upper and lower words possessed yodized elements, and thus there seemed to be a type of "medial harmony" (in a decidedly non-linguistic sense) between qie uppers and qie lowers. Thus a true contrast between yodized initials need not be posited, as minimal contrasts in yodization in upper qies merely reflects contrasting medials.

Chao has taken his cue from Ch'en Li (Ch'ieh-yun K'ao, 19__), who observed that cross-grade contacts existed (i.e. he noted that there was a superficially inexplicable overlap between certain groups of initials), but nonetheless did not hypothesize a yodized - non-yodized contrast in initials. Karlgren in fact drew the same conclusion regarding the distribution of s vs. s^j, assuming a single underlying s. However, he failed to extend this analysis to account

for the patterning of other initials, resulting in an initials series which Chao shows to possess redundancies.

Unlike Karlgren, who tended to take each individual fanqie at its face value, Chao placed the individual fanqie in the context of the fanqie pattern as a whole, with the specific goal of detecting redundant specifications as revealed by complementary distribution.

Thus while Karlgren indeed seemed to possess an intuitive grasp of the notion of the phoneme (based on his conclusions regarding *s*), he nonetheless fails to explicitly embrace this notion, and his redundant initials series is the inevitable consequence.

Returning now to the Chao's account of medial yodization, the author extends his reanalysis to account for almost all apparent contrasts in initial yodization. For example, for *l*-initial main words, a yodized lower is employed when the main word contains a palatal medial, while plain /*l*/ is employed elsewhere. In a few instances however, a grade III lower is employed for a non-grade III main word, and thus the problem for Karlgren was that this "medial harmony" was not employed exceptionlessly. Indeed, in later rime tables (e.g. the *Yi Qie Qing Yin Yi*) the tendency toward medial harmony more closely approached exceptionlessness, and initial yodization was thus more readily analyzable as non-contrastive.

Besides *l*, the complementary distribution of qie uppers between grade III (yodized) and other lowers in both labials and velars clearly indicates that yodization of initials is usually non-contrastive.

For labials, as *s* and *l*, a superficial scan of qie uppers would indicate an underlying contrast in yodization. However, the choice of upper is determined not by initial yodization, but by medial yodization represented in both uppers and lowers: yodized lowers tend to occur with yodized uppers, while non-yodized lowers tend to occur with non-yodized uppers. In other words, there are no minimal pairs in which an identical lower occurs with both a yodized and non-yodized upper.

For the velars, we'll begin by taking *k* as a case study.

We see the following distribution of velar stops, including hekou variants:

kan	:	<u>k</u> ang	<u>a</u> n	kuan	:	<u>k</u> uo	<u>x</u> uan
kan	:	<u>k</u> an	ng <u>a</u> n	kwan	:	<u>k</u> wai	<u>v</u> wan
kiAn	:	<u>k</u> iAt	ngi <u>a</u> n	kiwAn:	<u>k</u> iwAn	<u>j</u> iwAn	
kien	:	<u>k</u> iet	* <u>i</u> en	kiwen:	<u>k</u> iwet	<u>v</u> iwen	

Instead of postulating eight underlying velar stops, Chao assumes that harmonizing uppers and lowers were chosen to indicate the presence or absence of the medial yod. Therefore only /k/ is underlyingly present. In fact, the distribution of yodized initials for velars is indeed limited to grade III. This is certainly a more palatable analysis than, say, Schaank's, which posits a four-way underlying contrast in palatalization (*k*, *k^j*, *k^jj*, *kj*). Karlgren's assumptions

differed only minimally, as shown in Table II.

These analyses are suspect for many reasons: how would such contrast be phonetically implemented and realized? How would such contrasts be phonologically represented? Assuming that the answer to these two questions is "it couldn't", how could the Ancient Chinese speaking child acquire such a distinction? These questions, of course, may only legitimately be asked within the context of our present state within the evolution of phonological theory. When Karlgren wrote his *Etudes*, the classical phoneme had not yet been posited.

Instead, Karlgren was solely concerned with any and all *phonetic* contrasts within Ancient Chinese, as characterized by his source material and modern reflexes. Phonetic implementation, phonological contrast, and acquisition would seem far beyond Karlgren's domain of investigation.

Writing in 1942, Chao of course is working within a far more constrained theory, and thus must motivate his analysis within the stricter limits imposed. To his discredit, Chao seems inappropriately

content having phonemicized Karlgren's reconstruction, without having taken the obvious next step of showing how Karlgren's assumed phonetic realizations are untenable.

Returning now to Chao's analysis of velar yods, the table below indicates minimal pairs exist between i and j in grade III (e.g. ieu, jieu), in that both take pure and yodized initials, suggesting a lexical contrast in yodization.

The distribution of velar initials and their yodized variants is as follows:

finals			initials						
I	II	IV	k	k'	x	v	ng	*	
	III _α	III _β	kj	k'j	g'j	xj	ngj	i j *j	

Here, Chao capitalizes on a theory posited by Ko- I'ching in the T'oung Pao journal (1932), that j is actually a velar fricative (apparently, Karlgren comes close to drawing the same conclusion, characterizing j as a "sonant prepalatal fricative"). Chao then takes j as the yodized counterpart of v (thus reclassifying it as an obstruent). Now the i is simply a palatal sonorant onset, naturally taking only grade III lowers, and, crucially, no minimal contrast in yodization remains:

I	II	IV		k	k'		x	v	ng	*
III _α	III _β		ki	k'i	g'i	xi	<u>vi</u>	ngi	i	*i

Finally, Chao explains away Karlgren's four-way contrast between *j* (now reclassified as *v*), the non-fricative consonantal *i*, as in *ieu*, the non-syllabic vocalic *i*, as in *ie* and *ei*, and the monophthongal *i* and *i:*. These phonetic contrasts are shown never to contrast minimally: Grade III lowers tend to possess a close *i* due to medial harmony. Grade IV finals, which have a low or open *i*, do not possess yodized lowers.

2. Kaikou and Hekou

In Section 2, Chao inquires into the *kaikou/hekou* (labial - non-labial) distinction in medials. Karlgren originally hypothesized a distinction between medial vocalic *u* and medial consonantal *w*. He analyzed modern contrasting forms, and ancient contrasting rimes which took the same lower as possessing a *u-∅* contrast, presumably in order to represent the clear-cut contrast between them. However, for modern contrasts and ancient main words that took different rimes, he analyzed the labial variant as *w*. Chao notes, however, that different rime tables employed different rime systems, so that Karlgren's non-minimal pairs (reconstructed with *u*) indeed appeared as minimal pairs in other tables.

Chao thus agrees with Karlgren's later re-analysis of his own system by positing the existence of a single underlying /u/, "which is a vocalic medial, a consonantal medial, a principal vowel, or an ending, depending on its phonetic environment...". I assume that minimal pairs do not exist between vocalic medials and consonantal medials (otherwise, there would be no distinctive phonetic environment to speak of).

3. Hekou and Kaikou in Chunyin

The Qieyun possessed an inconsistency whereby labial initials pattern both like hekou and kaikou, in that a given (labial initial) character is employed as a hekou lower, but this same character's fanqie employs a kaikou lower:

	main	upper	lower
1.	kan:	kuo	van
2.	van:	v u	kan
3.	kwan:	kuo	vwan
4.	vwan	vuo	b'ʔan
5.	b'ʔan	b'ou	van

k and *v* both take both kaikou and hekou initials, as shown in (1) to (4). As (4) is obviously hekou, the value of its lower qie is obviously regarded as hekou as well. However, this very word's

lower qie contains is kaikou. Many qie lowers for labials were in fact labial-initial, indicating a tendency to spell labial initials with labial lowers.

Karlgren assumed all labial initials were hekou, triggering lip protrusion that spread to the medial position. However, as Chao notes, a sample indicates no minimal pairs, with either a kaikou or hekou final, but never both occurring with a given labial initial in the rime tables:

	ping	shang	qu	ru
	kai he	kai he	kai he	kai he
p		uang ang		uang ak
p'	ang	ang		ak
b'		uang	ang	ak
m	ang	ang	ang	ak

Chao thus concludes that there is no kaikou/hekou contrast within labial initials: labial initials are either all kaikou, all hekou, or neither. Note that Chao need not assume that labial onsets pattern differently from non-labial onsets, in which the kaikou-hekou distinction is obviously maintained. Instead, he may simply characterize the kaikou-hekou in chunyin as a redundant value, and therefore never contrastive either phonologically, or presumably, phonetically. This contrasts sharply with Karlgren's assumption.

Karlgren, operating in pre-phonemic theory, required a purely phonetic motivation for the lack of kaikou-hekou distinctions in chunyin. Taking, as he did, all superficial contrasts in the rime tables as reflecting actual phonetic contrasts, he was forced to posit a phonetic

explanation to account for the noted inconsistencies in the fanqie.

Thus, although Chao's conclusions regarding the kaikou/hekou distinction in chunyin do not differ from Karlgren's Chao nonetheless exploits phonemic theory to provide a more theoretically sound account of the data. Recent advances in underspecification theory provide still more support for Karlgren's initial conclusions (though I don't see myself running to a journal about it).

4. Dentilabialization

Ten Ancient bilabial forms are realized as labiodentals in their modern reflexes. Both Karlgren and Chao assume that this diachronic process was conditioned by the nature of the finals, nine of which were Grade III hekou: iu iwen, iung, iwong, iw i, iwei, iw m, iw n, iwong. Karlgren claimed that the word must be in grade III, and must be a "primary" hekou (i.e. palatalized, labialized). However, we've already seen that bilabials do not possess a contrastive kaikou/hekou value, and further, Karlgren's primary/secondary hekou distinction is based solely on subsequent behavior regarding dentilabialization. Thus his argumentation is circular.

Chao hypothesizes that, indeed, palatalization is necessary for dentilabialization, but not sufficient. He claims that the primary vowel must be central or back, and thus post-onset jaw retraction will result in a constriction in the labiodental region.

Of the ten finals in which dentilabials occur, nine have central or back vowels. However, forgetting about the tenth final, which Chao is able to explain away, there are several finals which do possess the necessary qualifications for dentilabialization (yodized and mid/back vowels), but nonetheless did not trigger the process. Chao considers the possibility that in these forms, palatalization has fronted the nucleus, thus bleeding diachronic dentilabialization, but ultimately admits his own skepticism on the issue, recognizing his argumentation's *ad hoc* quality. Furthermore, it is velar codas that appear to have blocked dentilabialization in forms that otherwise meet the structural description of the process, despite the fact that, given Chao's phonetically-driven account, their backness would make them the most likely candidates to trigger the process.

Chao is ultimately at a loss to account for the full range of facts regarding the triggering mechanism for dentilabialization, leaving the matter for future researchers to investigate.

5. Vowels

Karlgren's phonetic vowel inventory possessed sixteen segments:

His reconstructed finals, divided into wai and nei groups, are

shown in Table III.

Chao capitalizes on Lo Ch'ang-p'ei's observation that *e* is the only vowel to occur in both wai and nei groups. He considers the possibility that the a-e contrast is allophonic, conditioned by the closeness or openness of the medial yod. Therefore, close *i* and open *i* are re-analyzed as underlyingly contrastive, long *e* is wai, resulting from a neutralization rule. Short *e* is phonemic, always nei. Note, however, that Chao never inquires into the exact nature of the presumed phonological contrast between open and close *i*. However, it is evident (though not clearly stated until the final section) that Chao ultimately rejects the idea of a close-open *i* phonemic contrast, and thus really is simply offering up the analysis more as an academic exercise than as a serious attempt at reanalysis.

Chao further notes the complementary distribution of *ai* and *ei*, with *ai* in wai groups and *ei* in corresponding nei groups. Following Maspero, he classifies these as non-contrastive, the *ai* being short

Thus Chao's final inventory is as follows:

6. Conclusion

In his final section, Chao again presents the tables of initials, finals, and co-occurrences, this time with the revisions he has argued for:

- There is no contrast in yodization in most initials. Rather, "There is a tendency, manifested in various degrees for various initials, for the initial ch'ieh word representing all initials to agree with the final ch'ieh word (and therefore also with the main word) as to having a close i or not" (p.230).
- There is no kaikou/hekou distinction in labials.

- *i* and *i* are allophonic
- *j* is actually the velar fricative, *v.*, resulting in the obliteration of the apparent *i-j* minimal contrasts in Grade III.
- There is no contrast between the hekou *u* and *w*: they are phonetically identical.
- Finally, Chao reiterates that there is only one phoneme *i*, which is open or close, conditioned by the main vowel (open for *e*, close elsewhere). It is unclear how this conclusion jibes with his re-analysis of the *a-e* allophonic contrast, in which open and close *i* are phonemically contrastive.

Ultimately, Chao's phonemic reanalysis of Karlgren's reconstruction is primarily the reduction of redundancy in Karlgren's initials series. Further discussion on Chao's part comes off as mere afterthought: his conclusions regarding contrastive hekou values are in accordance with Karlgren's own reanalysis in that author's *Compendium*. His analysis of the kaikou/hekou value in the chunyin series, while formulated within an arguably more advanced theory ultimately is indistinct from Karlgren's. Finally, his success in accounting for diachronic labialization, and in phonemicizing the vowel inventory, is meager at best.