

THE VALUE OF \bar{i} , i , \bar{u} , AND u IN MIDDLE KHMER

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This is the fourth of a series of studies on the vowel and consonant systems of Middle Khmer, tentatively assigned to the period from the 14th to the 18th centuries. The first paper in the series¹ reported the results of an analysis of eighteen short metrical texts and showed how these can be placed in quasi-chronological sequence on the basis of their rhymes. This was followed by a description of the changing distribution of final $-ra$ and $-la$ ² and by an examination of the graphemes $\bar{a}u$ and ai ,³ both using the same corpus of 5,164 rhymes as had been developed for the first paper. We turn now to investigate the graphemes \bar{i} , i , \bar{u} , and u as these are found in the same material. Future studies will treat vowels occurring before the final palatals, the development of modern / $\text{o}\bar{\text{e}}$ /, and the grapheme e in the same body of texts. A sketch of the vocalism, including information on the Middle Khmer system, has been given elsewhere.⁴

The analytical procedure followed here is essentially the same as before. The entire corpus is first sifted, all rhymes involving orthographic \bar{i} , i , \bar{u} , and u being separated out. The rhymes in question are then typed and weighed from the point of view of their relevance to the problem of determining their value during the Middle Khmer period. The modern value of the four graphemes is taken as a known quantity, and the modern regularized orthography is preferred over that originally used in the seventeen undated $\text{cp}\bar{\text{a}}'\text{pa}$ texts. The members of each rhyming pair are compared and inferences are drawn from their orthographic shape, from their modern value, from the pre-modern pronunciation of loanwords present, and from known systematic changes in the vocalism. These inferences are finally tested against the collected rhymes.

While many of the rhymes used have been invalidated by later phonological changes, it is assumed that all of the rhymes indicated

by the meter of each text were, with very few exceptions, valid at the time of composition.

In isolating the evidential from the nonevidential portion of the assembled data, it is necessary to draw a distinction between "perfect" and "imperfect" rhymes. Perfect \bar{I} rhymes are those in which both members of a rhyming pair show graphic \bar{i} in their relevant syllables. Perfect \bar{i} , \bar{u} , and \bar{u} rhymes are similarly those in which both members have the same orthographic vowel. Imperfect rhymes are those in which only one member of a rhyme contains graphic \bar{i} , \bar{i} , \bar{u} or \bar{u} , which rhymes with some other orthographic form. Exceptions are made in the case of certain allographs, to be mentioned as they are introduced. The reason for this distinction, as well as examples of both classes of rhyme, will be given shortly. In our group of texts perfect rhymes account for 62.4% of all \bar{i} , \bar{i} , \bar{u} and \bar{u} rhymes, imperfect rhymes accounting for the remaining 37.6%.

Table 1 shows that the total corpus contains 366 perfect and imperfect \bar{I} rhymes and 298 perfect and imperfect i rhymes. The \bar{i} rhymes have an average frequency of 6.45% and individual frequencies which rise and fall erratically between a peak of 13.82% and a low of 0.79%. Maxima are registered for the Cpā'pa srī, the 'Ariyasattha, and the Ker(ti) kāla, minima for the Kūna cau lpōeka (A) and the Bākya cā'sa. The i rhymes show an average frequency of 5.64% and individual frequencies which, while roughly mirroring the profile of \bar{i} rhymes, range narrowly between 8.36% and 4.00%.

Table 2 shows that the corpus contains 217 perfect and imperfect \bar{u} rhymes and 243 perfect and imperfect u rhymes. The \bar{u} rhymes have an average frequency of 4.23% and individual frequencies which, though less extreme than those of \bar{i} rhymes, rise and fall at random between a peak of 7.57% and a low of 2.08%. Maxima are registered for the Cpā'pa dūnmāna kūna, the 'Ariyasatthā, and the Kūna cau lpōeka (A), minima for the Hai mahājana (I), the Krāma, and the IMA. The i rhymes have an average frequency of 4.72% and individual frequencies ranging from a high of 10.07% down to zero. Maxima are registered for the Prusa, the Bākya cā'sa, and the Hai mahājana (I), minima for the Krāma, the Vidhūrapañḍita, and the Kūna cau.

At issue in this paper, therefore, are 1,124 rhymes representing 21.8% of the total corpus. It remains to be seen how many of these are usable in our investigation.

In Table 3 we see that perfect \bar{I} rhymes number 313 and perfect i rhymes number 127. The \bar{i} rhymes, with an average frequency of 5.52%, have individual frequencies ranging from 11.9% to 0.8%. Maxima are registered for the Srī, the 'Ariyasatthā, and the Ker(ti) kāla, as before, while minima are registered for the Kūna cau lpōeka (B), the Bākya cā'sa, and the Kūna cau lpōeka (B). The i rhymes,

	total rhymes	ī	rhymes	i	rhymes
Ker(ti) kāla	105	11	10.48%	7	6.66%
Kūna cau	328	22	6.71%	14	4.26%
Rājaneti	214	20	9.35%	13	6.07%
Krama	154	6	3.90%	7	4.54%
Hai mahājana (I)	337	29	8.61%	20	5.93%
IMA 38	493	39	7.91%	28	5.67%
Kūna cau lṛeḥka (A)	297	9	3.03%	14	4.71%
Vidhūrapaṇḍita	225	14	6.22%	9	4.00%
Paṇṭām pitā	295	9	3.05%	19	6.44%
Kūna cau lṛeḥka (B)	127	1	0.79%	6	4.72%
Trīneti	380	22	5.79%	19	5.00%
Dūnmāna khlwna	175	11	6.29%	10	5.71%
Bākya cā'sa	97	1	1.03%	4	4.12%
Hai mahājana (II)	324	23	7.10%	20	6.17%
Paṇṭām 'ū buka	291	10	3.44%	14	4.81%
Dūnmāna kūna	251	22	8.76%	21	8.36%
Srī	579	80	13.82%	42	7.25%
Prusa	298	16	5.37%	19	6.37%
'Ariyasatthā	194	21	10.82%	12	6.18%
	5,164	366	6.45%	298	5.63%

Table 1: General Frequencies of ī and i Rhymes.

	total rhymes	\bar{u} rhymes	u rhymes
Ker(ti) kāla	105	6 5.71%	5 4.76%
Kūna cau	328	10 3.05%	6 1.83%
Rājaneti	214	8 3.74%	10 4.67%
Krama	154	4 2.60%	0
Hai mahājana (I)	337	7 2.08%	22 6.53%
IMA 38	493	14 2.84%	13 2.64%
Kūna cau lpeka (A)	297	19 6.40%	16 5.39%
Vidhūrapaṇḍita	225	7 3.11%	3 1.33%
Paṇtām pitā	295	18 6.10%	15 5.08%
Kūna cau lpeka (B)	127	4 3.15%	5 3.94%
Trīneti	380	15 3.95%	15 3.95%
Dūnmāna khlwna	175	5 2.86%	11 6.29%
Bākya cā'sa	97	3 3.10%	7 7.22%
Hai mahājana (II)	324	10 3.09%	20 6.17%
Paṇtām 'ū buka	291	18 6.19%	15 5.15%
Dūnmāna kūna	251	19 7.57%	11 4.38%
Srī	579	25 4.32%	29 5.01%
Prusa	298	12 4.03%	30 10.07%
'Ariyasatthā	194	13 6.70%	10 5.15%
	5,164	217 4.23%	243 4.72%

Table 2: General Frequencies of \bar{u} and \underline{u} Rhymes.

	total rhymes	\bar{i} rhymes	i rhymes
Ker(ti) kāla	105	9 8.6%	2 1.9%
Kūna cau	328	21 6.4%	5 1.5%
Rājaneti	214	16 7.5%	6 2.8%
Krama	154	6 3.9%	0
Hai mahājana (I)	337	21 6.2%	8 2.4%
IMA 38	493	35 7.1%	4 0.8%
Kūna cau lpeka (A)	297	9 3.0%	10 3.4%
Vidhūrapaṇḍita	225	13 5.7%	3 1.3%
Paṇṭāṃ pitā	295	9 3.1%	13 4.4%
Kūna cau lpeka (B)	127	1 0.8%	4 3.1%
Trīneti	380	19 5.0%	7 1.8%
Dūnmāna khlwna	175	9 5.1%	4 2.3%
Bākya cā'sa	97	1 1.0%	1 1.0%
Hai mahājana (II)	324	15 4.6%	10 3.1%
Paṇṭāṃ 'ū buka	291	9 3.1%	10 3.4%
Dūnmāna kūna	251	19 7.6%	13 5.2%
Srī	579	69 11.9%	11 1.9%
Prusa	298	12 4.0%	9 3.0%
'Ariyasatthā	194	20 10.3%	7 3.6%
	5,164	313 5.52%	127 2.47%

Table 3: Perfect \bar{i} and i Rhymes.

with an average of frequency of 2.47%, have individual frequencies ranging from only 5.2% to 0.8%. The highest are registered for the Dūnmāna kūna, the Paṅtām pitā, and the 'Ariyasathā, the lowest for the IMA, the Bākya cā'sa and the Vidhūrapaṅḍita. In the case of neither ī rhymes nor i rhymes do we have reason to assume any correlation between these frequencies and the relative age of the texts.

In Table 4 we see that perfect ū rhymes number 138 while perfect u rhymes number 124. The ū rhymes show an average frequency of 2.71% and individual frequencies ranging from 5.7% to 0.8%. Maxima are seen for the Ker(ti) kāla, the Kūna cau lṛeḳa (A) and Paṅtām pitā, and the Paṅtām 'ū buka, minima for the Dūnmāna kūna, the Bākya cā'sa, and the Hai mahājana (I and II). The u rhymes show an average frequency of 2.32% and individual frequencies ranging from 4.7% down to 0.6%. Peaks are registered for the Rājaneti and Prusa, the Paṅtām pitā, and the Kūna cau lṛeḳa (A), lows for the IMA, the Dūnmāna khlwna, and the Kūna cau. In neither case, again, can any correlation be discerned between these frequencies and the age of the texts.

Perfect rhymes thus number 702 and account for 62.4% of all ī, i, ū, and u rhymes in the corpus.

We address ourselves now to the question of what these perfect rhymes have to contribute to a solution of the problem under consideration. Since the phonological value of ī, i, ū, and u is unknown in Middle Khmer but known in modern Khmer, it can be said that the perfect rhymes in our eighteen texts are divisible into three types according as their members have High Register (HR) or Low Register (LR) reflexes in the modern language.

In one of these types, both members of the rhyme presuppose HR reflexes, e. g. jī/çii/ : gambī /kumpii/ (R 33fe),⁹ dharaṅī /thəɔɔɔnii/ : r̥ddhī /r̥y̥tthii/ (HMI 75bc); gaṃnita /kumnit/ : gita /kit/ (KC 68de), 'āditya /qaatit/ : jita /cit/ (HMI 66d/67b); gūra /kuur/ : dadūra /ttuur/ (KK 3bc), grū /kruu/ : 'abhirū(ha) /qaphiruu/ (A32ab); buka /puk/ : duka /tuk/ (KC 29de), guṅa /kun/ : muna /mun/ (T 67ab).

In a second type, both members of the rhyme presuppose LR reflexes, e. g. kī /kd̥əj/ : krakrī /krakr̥əj/ (KC 20ef), pī /b̥əj/ : sratī /sr̥ad̥əj/ (P 9lab); phtita /pd̥ət/ : citta /c̥ət/ (R 32ce), tamrih /tamr̥əh/ : trih /tr̥əh/ (T 19de), kūna /k̥oon/ : p'ūna /p̥q̥on/ (KK 14bc), 'āsrūva /qaasr̥ow/ : kūva /k̥ow/ (S 176c/177a); 'usa /qoh/ : khusa /khoh/ (HMI 40ab), cuka /cok/ : sukha /sok/ (PP 54g/55c).

In the third type of rhyme one member is reflected by a HR form, the other by a LR form, e. g. dhūlī /thuulii/ : t̥ī /d̥əj/ (KK 18bc), sālī /saal̥əj/ : kutumbī(ka) /k̥omp̥ii/ (V 50ab); tica /t̥əc/ : dranica /tr̥ənic/ (KC 4g/5c), gita /kit/ : citta /c̥ət/ (S 215a); madhūra

	total rhymes	\bar{u} rhymes	u rhymes
Ker(ti) kāla	105	6 5.7%	2 1.9%
Kūna cau	328	10 3.0%	4 1.2%
Rājaneti	214	7 3.3%	10 4.7%
Krama	154	4 2.6%	0
Hai mahājana (I)	337	4 1.2%	9 2.7%
IMA 38	493	12 2.4%	3 0.6%
Kūna cau lṭṭeka (A)	297	13 4.4%	12 4.0%
Vidhūrapaṇḍita	225	5 2.2%	0
Paṇṭāṃ pitā	295	13 4.4%	12 4.1%
Kūna cau lṭṭeka (B)	127	2 1.6%	2 1.6%
Trīneti	380	13 3.4%	6 1.6%
Dūnmāna khlwna	175	3 1.7%	2 1.1%
Bākya cā'sa	97	1 1.0%	2 2.1%
Hai mahājana (II)	324	4 1.2%	7 2.2%
Paṇṭāṃ 'ū buka	291	12 4.1%	12 4.1%
Dūnmāna kūna	251	2 0.8%	5 2.0%
Srī	579	12 2.1%	17 2.9%
Prusa	298	8 2.7%	14 4.7%
'Ariyasatthā	194	7 3.6%	5 2.6%
	5,164	138 2.71%	124 2.32%

Table 4: Perfect \bar{u} and \underline{u} Rhymes.

/mathuur/: cūla /còol/ (R 48g/49c), trūva /tròow/: byū(ha) /pjuu/ KCLA 8g/9c); sam'uya /samqoj/: ruya /ruj/ (KC 20ab), manussa /mnuh/: prusa /proh/ (P 3ab).

In considering these examples we note at once the close apparent correspondence between the four graphemes and their HR realizations: ī /ii/ [i:], i /i/ [ɪ], ū /uu/ [u:], u /u/ [ʊ]. On the other hand, we cannot fail to recognize that the same graphemes have LR realizations and that these differ appreciably from their HR counterparts. We are warranted in assuming from their orthographic representation that the HR nuclei have undergone little or no change from their pre-modern shapes. We are warranted in assuming from the difference between the HR nuclei and their LR counterparts that the latter have developed from their pre-modern forms by several types of lowering: ī /əj/ [ɜ:j], i /ə/ [ɛ<], ū /do(w)/ [o: ~ɜ:w], u /o/ [o<]. Both of these assumptions accord well with what we know of the development of the modern vocalism.⁶ Briefly, the register of each nucleus is governed by its former environment, originally voiced initials yielding HR nuclei, originally voiceless initials yielding LR nuclei. The circumstance that the former environment is, with very few exceptions, shown by the conservative writing system is an incidental convenience. The main point here is that by knowing the register of a nucleus we can reconstruct its pre-modern equivalence: HR /ii, i, uu, u/ and LR /əj, ə, do(w), o/ are alike from pre-modern /ii, i, uu, u/. In this light, the meaning of the perfect rhymes given above becomes clearer. While the HR : HR rhymes undergo no change, the LR : LR rhymes appear as ktī /k?dii/: krakrī /krɔkrii/, pī /?bii/: sratī /srɔ?dii/; phtita /p?dit/: citta /cit/, tamriḥ /tɔmriḥ/: triḥ /trih/; kūna /kuun/: p'ūna /pquun/, 'āsrūva /qaasruuw/: kūva /kuuw/; and 'usa /quh/: khusa /khuh/, cuka /cuk/: sukha /suk/. The discrepant HR:: LR rhymes, more-over, are now heard as they were at the time of composition: dhūī /thuulii/: tī /?dii/, sālī /saalii/: kuṭumbī(ka) /k?dumbii/; tica /tic/: drānica /trɔnic/, gita /kit/: citta /cit/; madhūra /madhuur/: cūla /cuul/, trūva /truuw/: byū(ha) /bjuu/; sam'uya /sɔmquj/: ruya /ruj/, manussa /mnuh/: prusa /pruh/. In and by themselves, however, our perfect rhymes tell us nothing regarding the pre-modern value of the graphemes in question. Were it not for (a) the fact that we are concerned with rhymes, (b) our assumption that these were almost entirely valid at the time of composition, and (c) their orthographical form, we should be on very infirm ground indeed. What we have been doing up to this point, it may be said, is comparable to weighing English rhymes (soot : moot, cough : rough) which are spelled similarly but are pronounced differently in modern English and may or may not have rhymed in Middle English. In short, we need other evidence. We must consequently look to imperfect rhymes and see what confirmation or what new conclusions can be had from them.

The four tables given hereafter show that imperfect rhymes

number 422, a figure representing 37.5% of our working corpus, and have an average frequency of 2.0%.

Table 5 shows that imperfect i rhymes number 53 and have an average frequency of only 0.9%. Of these 33 (62.3%) are rhymes in which one member has orthographic i and the other has ai in the relevant syllable. Of the remainder 6 (11.3%) are i : e rhymes and 5 (9.4%) are i : ɨ rhymes, while in 9 others (17%) i rhymes with some other graphically vowel. It should be noted in particular that the individual frequencies for the eighteen texts rise and fall unpredictably between a maximum of 2.5% and a minimum of 0.3%, and show no pattern of increase or decrease correlatable with the age of the texts.

In "The Value of au and ai in Middle Khmer" 25 i : ai rhymes were listed in full and discussed. These may be exemplified here by smarat i /smaardəj/ : thlai /tlaj/ (HM 66bc), khc i /kcəj/ : nai /nəj/ (DKh 4bc), metr i /méetrəj/ : kansai /kansaj/ (DKn 86ab), and pt i /pdəj/ : ɬadai /daatəj/ (S 22ab). To these we may now add 8 rhymes between i and āya, an allograph of ai:

HMI	45cb	<u>smārat i</u> /smaardəj/	: <u>sañsāya</u> /soŋsaj/ ⁷
	45cd	<u>smārat i</u> /smaardəj/	: <u>vināya</u> /winəj/
V	5lb/50d	<u>kt i</u> /kdəj/	: <u>jalasrāya</u> /culəsrəj/
HMI	79d/80b	<u>pāram i</u> /baarəməj/	: <u>bhāya</u> /phəj/
DKn	46ab	<u>metr i</u> /méetrəj/	: <u>prāsrāya</u> /praasrəj/
S	61c/62a	<u>sr i</u> /srəj/	: <u>haḍdāya</u> /hrətəj/
	62ba	<u>sraṭ i</u> /sraḍəj/	: <u>haḍdāya</u> /hrətəj/
A	41c/40g	<u>kt i</u> /kdəj/	: <u>-ālāya</u> /-aaləj/

It has already been shown that the i member of the 25 i : ai rhymes was in every case reflected by a modern LR syllable in /-əj/. This observation finds unqualified confirmation in the 8 i : āya rhymes just cited. On the other hand, in the case of the i : ai rhymes previously reported it was found that 17 out of the 25 ai members were reflected by modern HR forms in /-əj/ while 8 corresponded to modern LR forms in /-aj/. The 8 āya members of the rhymes just given are similarly ambivalent, corresponding to 4 HR and 4 LR syllables in the modern language. It can therefore be said that, of the 33 ai ~ āya members in question here 21 or 63.6% reflect the HR while 12 or 36.4% reflect the LR. The inequality of these percentages is not enough to justify assumption of any clearly defined pattern. Hence we can only repeat what was said earlier. It is clear that if ai (and āya) had originally represented [aj] these various rhymes would not have been possible. Moreover, from the fact that we find ai and āya members which presuppose different registers in rhyme with i members presupposing only the LR we can only suppose that the LR reflex of Middle Khmer /ii/ (i) had developed before registral contrast was fully

	total rhymes	ai	e	\bar{I}	other	total	
Ker(ti) kāla	105	0	1	1	0	2	1.9%
Kūna cau	328	0	1	0	0	1	0.3%
Rājaneti	214	1	1	1	1	4	1.9%
Krama	154	0	0	0	0	0	
Hai mahājana (I)	337	7	0	0	1	8	2.4%
IMA 38	493	2	1	0	1	4	0.8%
Kūna cau lṛeḥka (A)	297	0	0	0	0	0	
Vidhūrapaṇḍita	225	1	0	0	0	1	0.4%
Paṇṭāṃ pitā	295	0	0	0	0	0	
Kūna cau lṛeḥka (B)	127	0	0	0	0	0	
Trīneti	380	0	0	2	1	3	0.8%
Dūnmāna khlwna	175	2	0	0	0	2	1.1%
Bākya cā'sa	97	0	0	0	0	0	
Hai mahājana (II)	324	8	0	0	0	8	2.5%
Paṇṭāṃ 'ū buka	291	0	0	0	1	1	0.3%
Dūnmāna kūna	251	3	0	0	0	3	1.2%
Srī	579	7	0	0	4	11	1.9%
Prusa	298	1	2	1	0	4	1.3%
'Ariyasatthā	194	1	0	0	0	1	0.5%
	5,164	33	6	5	9	53	0.9%

Table 5: Imperfect \bar{I} Rhymes.

established for Middle Khmer /əj/ (ai ~ āya). In all 33 cases, therefore, i must have had its modern LR value of /-əj/ while ai and āya must have had their pre-modern value of /əj/. The eight rhymes just given might hence be rewritten as follows in pre-modern as well as modern terms:

smāratī / smaarʔdii > smaardəj/	saṅsāya/səŋsəj > saŋsaj/ ⁸
smāratī / smaarʔdii > smaardəj/	vināya/winəj > winəj/
ktī / kʔdii > kdəj/	jalasrāya/jələsrəj >
	culəsrəj/
pāramī / ʔbəarəmi > baarəməj/	bhāya / bhəj > phəj/
metrī / meetri > meetrəj/	prāsrāya/prasrəj >
	praasrəj/
srī / sri > srəj/	haṛdāya/hrytəj > hrytəj/
sratī / srəʔdii > srədəj/	haṛdāya/hrytəj > hrytəj/
ktī / kʔdii > kdəj/	-ālāya / -aaləj > -aaləj/

These examples are enough to show that rhymes of the type in question could have been possible only during a limited period in the transition from the vocalism of Old Khmer to that of the modern language.

Leaving i : āya (ai) rhymes and going on to the remaining imperfect i rhymes in the corpus, we find that Table 5 registers 6 rhymes in which orthographic i is paired with e. Upon examining these we are struck by the fact that the i members of five are reflected by modern HR forms:

KK	15d/16b	bīra /piir/	: ker(ti) /kèer/ ⁷
KC	6ed	bīra /piir/	: ker(ti) /kèer/
R	23ab	jhnānīsa /cnīāniih/	: cacesa /ccèeh/
P	19ab	ralīna /rliiŋ/	: dheña /théer/
	25ba	ralīna /rliiŋ/	: dheña /théer/

Regarding the e member of these rhymes, we are reminded in the first place that modern HR /é/ is often articulated as [ɛ:] while modern LR /ee/ is often [ɛ:]. It seems unlikely that the authors of the Ker(ti) kāla and the Kūna cau ever intended rhyme between /ii/ and [e:] or [ɛ:]. We are reminded in the second place that ker(ti) 'fame, glory' is a modification of Sanskrit kīrti, in conformity with a fairly common correspondence.⁹ In the two cases above we can only suppose that it was still [ki:r] at the time of composition. In the late Cpā'pa prusa, on the other hand, the twofold occurrence of ralīna : dheña is good evidence that dheña was already being pronounced [thi:ŋ] instead of pre-modern [dhe:ŋ] and consequently that Middle Khmer /ee/ (e) had by the date of this text already split into its present registral shapes. As for the form cacesa in the above rhymes, we must assume either that the rhyme in which it occurs was never valid or, as is more probable, that the contemporary orthography must have been *cacīsa.

The sixth and last of our $\bar{i} : e$ rhymes is also the most instructive. This is:

IMA 105a/104c $kt\bar{i} /kd\bar{a}j/$: $leya / laa\bar{a}j/$ ⁷

in which both members are reflected by modern LR forms. The latter member has the Middle Khmer orthography of modern ?oeya . Re-writing the rhyme in pre-modern as well as modern terms makes it clear that it could have been valid only during a limited period, namely after registral contrast had been established for original /ii/ but before contrast had been established for original $/\bar{a}\bar{a}/$:

$kt\bar{i} /k\text{?dii} > kd\bar{a}j/$: $\text{?oeya} /l\bar{a}j > laa\bar{a}j/$ ⁸

Table 5 also shows 5 $\bar{i} : \bar{a}$ rhymes. In reality only three of these have long \bar{a} in the member rhyming with \bar{i} . These are:

KK 4cb $krap\bar{i} /krab\bar{a}j/$: $bhl\bar{i} /pl\bar{y}y/$ ⁷
 T 36ec $metr\bar{i} /m\acute{e}etr\bar{a}j/$: $banl\bar{a} /punl\bar{y}y/$
 44ec $metr\bar{i} /m\acute{e}etr\bar{a}j/$: $banl\bar{a} /punl\bar{y}y/$

It would be rash to draw conclusions from so few examples, which are consequently reserved for a forthcoming study on \bar{i} and \bar{a} . Of the two remaining rhymes, one has orthographic long \bar{i} pronounced [t], in rhyme with short \bar{a} , and hence reassignable to \bar{i} :

P lab $brahmag\bar{i}ti /prumm\bar{o}kit/$: $briddha /pr\bar{y}t/$ ⁷

This conforms with the modern standard language, in which contrast is easily lost between HR /i/ and HR / \bar{y} /. The other rhyme is:

R 34ab $jañj\bar{i}na /cunci\bar{i}ŋ/$: $\bar{t}\bar{i}na /d\bar{y}ŋ/$ ⁷

where the first term ('balance, scales') is from Old Khmer $\text{janjyan} /j\bar{a}ñj\bar{i}ŋ/$ ¹⁰ while the second ('to know') is from Old Khmer $\text{tyan} /t\bar{i}ŋ \sim \text{?di}ŋ/$ and Middle Khmer (e.g., IMA 16b) $\text{ty}\bar{i}na / \text{?di}ŋ > \text{?d}\bar{y}ŋ/$. Notwithstanding the modern orthography given above, it seems clear that the two rhymed when the Rājaneti was composed.

Table 5 shows, finally, 9 rhymes in which \bar{i} is paired with other orthographic vowels. These are:

R 12ba $s\bar{i}la /s\bar{e}l/$: $khjila /kcil/$ ⁷
 HMI 87ab $h\bar{i}na /hii /$: $bhli\bar{a}na /pl\bar{f}\bar{i}ŋ/$
 IMA 28ab $byira /piir/$: $rami la /r\bar{m}il/$
 T 5de $mantr\bar{i} /muntr\bar{a}j/$: $bi- /pi- /$
 PUB 2ed $\text{'v}\bar{i} /qaw\bar{a}j/$: $h\bar{o}eya /haa\bar{a}j/$
 S 193a $pt\bar{i} /pd\bar{a}j/$: $n\bar{a}ya /ŋ\bar{f}\bar{i}ŋ/$
 199a $pt\bar{i} /pd\bar{a}j/$: $n\bar{a}ya /ŋ\bar{f}\bar{i}ŋ/$
 202a $pt\bar{i} /pd\bar{a}j/$: $n\bar{a}ya /ŋ\bar{f}\bar{i}ŋ/$
 204a $pt\bar{i} /pd\bar{a}j/$: $n\bar{a}ya /ŋ\bar{f}\bar{i}ŋ/$

The first of these shows in its prior member the same long \bar{i} pronounced [ɿ] as has already been seen in the case of brahmag̃ti : br̃ddha, and is hence to be reassigned to short i. The second rhyme with bhliṅṅa (= phliṅṅa /pliṅṅ/) 'rain' is acoustically admissible, and will be treated in a future study on orthographic iə. In the third, the form byira corresponds to modern bīra. The latter member of this and the fourth rhyme shows short $\bar{i}/\bar{i}/$, which apparently varied freely in these forms with /ii/.¹¹ The fifth rhyme conforms exactly with the ktī : leya cited above from IMA 38 and confirms the inferences made from its occurrence. From its development,

'vī /wii > wəəj/ : hœya /həəj > haaəj/,⁸

one can see that the new LR reflex of Middle Khmer /ii/ appeared before the LR reflex of /əə/. The four identical rhymes from the Cpā'pa srī occupy optional positions in the metrical scheme. While it is possible that their constituents may not have been meant to rhyme, it is probable that they were so intended. By the time of this late text the prior member had certainly developed from /pʔdii/ to /p'dəəj/. The change /ŋaa > ŋéə > ŋiəj/ is established but not yet dated in relation to other changes. The important thing here, however, is that the syllable nucleus before final /j/ typically undergoes in modern standard Khmer a shift of stress and length from [i:ə] to [ie:] and even [ie:] which would make it more than ordinarily congruent with /p'dəəj/. We can therefore suppose that the rhyme in question was as admissible as the fiṅṅa : bhliṅṅa mentioned above.

We turn now to imperfect \bar{i} rhymes. Table 6 shows, first of all, a preponderance (84 items = 49.1%) of rhymes in which one member of the pair has graphic iya. These are somewhat awkward to classify inasmuch as iya, while written with short \bar{i} , is an allograph of long \bar{i} . As such it occurs paired either with itself or with \bar{i} in all but 4 cases. Like \bar{i} , iya is reflected by modern forms of both registers. The bulk of the rhymes in which it occurs are hence divisible into three types according as their members show HR or LR reflexes. As before, in one type both members presuppose HR reflexes, e.g. 'indriya /qəntrii/ : byādhī /pjiəthii/ (KC 50ba) and muhṅni /muhṅii/ : medriya /meetrii/ (IMA 126ce). In a second type, both members presuppose LR reflexes, e.g. lokiya /lókəəj/ : pī /bəəj/ (K9c/8g) and lokiya /lókəəj/ : 'apriya /qaprəəj/ (K 9ce). In the third type of rhyme one member is reflected by a HR form, the other by a LR form, e.g. 'indriya /qəntrii/ : pti /pdəəj/ (KK 2lcb) and 'apriya /qaprəəj/ : lajjī /lacci/ (KC 19g/20c). It can be seen from this much that rhymes of this type are to be reassigned to perfect \bar{i} rhymes. Like the latter, they tell us nothing of the pre-modern value of \bar{i} or i. It is nonetheless of interest to note that the ratio of the three types of rhyme just described is decidedly uneven. In 59 cases (70.2%) both members correspond to modern LR forms. In only 7 cases (8.3%) both members correspond to modern HR forms. In the remaining 18 cases (21.4%) the two members have different registers.

	total rhymes	iya	e	ā	ī	other	total	
Ker(ti) kāla	105	2	2	0	1	0	5	4.8%
Kūna cau	328	7	0	2	0	0	9	2.7%
Rājaneti	214	3	0	0	3	1	7	3.3%
Krama	154	6	1	0	0	0	7	4.5%
Hai mahājana (I)	337	5	2	1	2	2	12	3.6%
IMA 38	493	15	7	2	0	1	25	5.1%
Kūna cau lpeka (A)	297	2	0	2	0	0	4	1.3%
Vidhūrapaṇḍita	225	4	1	0	1	0	6	2.7%
Paṇṭām pitā	295	2	2	2	0	0	6	2.0%
Kūna cau lpeka (B)	127	0	1	0	1	0	2	1.6%
Trīneti	380	9	1	1	0	0	11	2.9%
Dūnmāna khlwna	175	5	1	0	0	0	6	3.4%
Bākya cā'sa	97	0	0	0	3	0	3	3.1%
Hai mahājana (II)	324	0	8	2	0	0	10	3.1%
Paṇṭām 'ū buka	291	2	0	2	0	0	4	1.4%
Dūnmāna kūna	251	3	3	0	2	0	8	3.2%
Srī	579	12	6	11	0	2	31	5.4%
Prusa	298	3	3	3	1	0	10	3.4%
'Ariyasatthā	194	4	1	0	0	0	5	2.6%
	5,164	84	39	28	14	6	171	3.2%

Table 6: Imperfect i Rhymes.

It was mentioned above that there are 4 exceptions to this pattern. In these graphic iyā is in rhyme with graphic ai and its āya allograph. The rhymes in question are:

HMI	25bc	-tirthiya /-dèerthəj/	:	bhāya /phéj/ ⁷
IMA	25cb	-dhibvatiya /-thipdəj/	:	didaiya /tiitəj/
DKh	20ab	lokiya /lóokəj/	:	ksāya /ksaj/
DKn	75c/76a	lokiya /lóokəj/	:	'ai /qaj/

These four are to be reassigned to the imperfect ai (āya) : ī which have been treated elsewhere.¹²

The next largest group on Table 6 consists of 39 i : e rhymes, representing 22.7% of all imperfect i rhymes. These are of sufficient interest to warrant being listed in full:

KK	16cb	sarila /sarəl/	:	ker(ti) /kèer/ ⁷
	20ab	riḥ /rih/	:	ceḥ /cèh/
K	5ba	khjila /kcil/	:	saraserā /səorsèer/
HMI	55ab	kicca /kəc/	:	bhleca /pléec/
	73d/74b	jaṃniḥ /cumniḥ/	:	radeḥ /rtéh/
IMA	3d/4b	-gitta /-kit/	:	sarbvejña /sarpéec/
	18ab	tica /təc/	:	bejña /péec/
	39ba	riḥ /rih/	:	nēḥ /néh/
	57ab	kica /kəc/	:	sreca /srèec/
	119fe	miña /mip/	:	pambeña /bampéep/
	140ab	sammlīna /samlēen/	:	phsiña /psèep/
	150ab	viña /wip/	:	beña /péep/
V	46bc	miña /mip/	:	ceña /cèep/
PP	21ec	tamriḥ /tamrəh/	:	camṇeḥ /camnèh/
	21ef	tamriḥ /tamrəh/	:	neḥ /néh/
KCLB	35ba	tamriḥ /tamrəh/	:	ceḥ /cèh/
T	79fe	pantica /bantəc/	:	greca /kréec/
DKh	5ba	diña /tip/	:	ceña /cèep/
HMII	8ab	tica /təc/	:	bhleca /pléec/
	10d/11b	tica /təc/	:	geca /kéec/
	11dc	banlica /punlic/	:	pambhleca /bampléec/
	51d/52b	viña /wip/	:	jreña /créep/
	57d/58b	viña /wip/	:	ceña /cèep/
	58cb	viña /wip/	:	ceña /cèep/
	60d/61b	viña /wip/	:	'amneña /qamnéep/
	78cb	lica /lic/	:	steca /sdac/ (sic)
DKn	71c/72a	viña /wip/	:	'amneña /qamnéen/
	72ba	viña /wip/	:	'amneña /qamnéen/

	91a/90c	riḥ /rih/	:	neḥ /néh/
S	49a	kiċca /kəc/	:	beca(na) /péec/
	77ab	viña /wiṇ/	:	mneña /mnéep/
	162c/163a	viña /wiṇ/	:	paṃbeña /bampéep/
	163ba	viña /wiṇ/	:	paṃbeña /bampéep/
	164a	tiḥ /təh/	:	ceḥ /cèh/
	221ba	kiċca /kəc/	:	beca(na) /péec/
P	12bc	miña /miṇ/	:	ceña /cèep/
	16b/15d	viña /wiṇ/	:	ceña /cèep/
	16bc	viña /wiṇ/	:	ceña /cèep/
A	19ab	pantica /bantəc/	:	bhleca /pléec/

One can see at a glance that these rhymes fall into two main groups. They comprise, in addition to a residue of three rhymes, 8 rhymes (20.5%) in which the *i* and *e* members occur before the visarga (/ -h/) and 28 rhymes (71.8%) in which the *i* and *e* members occur before a palatal final, in 12 cases /-c/, in 16 cases /-ŋ/. This majority includes the defective rhyme cited above from IMA 38, braḥmagitta (now brahmagīti) : sarbbejña (now sarbejña), about which there is little that can be said. For the rest it is enough to mention that in modern standard Khmer the palatal stop and nasal have, when final, the effect not only of typically inducing a palatal glide before their main articulation but also of definitely muddling the quality and the quantity of the preceding syllable nucleus. In impressionistic terms the vowels of miña (formerly meña) and ceña are indistinguishable; length contrast between them is lost, while both are centralized and lowered to a degree difficult to define without acoustic analysis. Thus the pronunciation of steca (formerly stā'ca) recommended by the semi-official Vacanānukrama khmēra is /sdac/ [sʔdaʔč], as above.¹³ There is no reason not to attribute these same phenomena to Middle Khmer, since they offer the simplest justification for the rhymes in question.

The eight rhymes with visarga can be explained in terms of divergent development. The form riḥ (formerly reḥ) occurs three times, and changed from Middle Khmer /reh/ to early modern HR /réh/ [rɛh], after which its orthography was adjusted. The form ceḥ and its derivative camneḥ account for another three occurrences, and change from Middle Khmer /ceh/ and /cəmnəh/ to modern LR /cèh/ [čɛh] and /cəmnèh/[čəmnɛh]. Hence the rhyme riḥ : ceḥ (KK 20ab) would have sounded as [reh : čɛh] at the time of composition. The form neḥ (formerly neḥ or nēḥ) also occurs three times; this changed from Middle Khmer /neh/ to modern HR /néh/ [nɛh], without modification of the orthography. The rhyme riḥ : neḥ (IMA 39ba, DKn 91a/90c) would therefore have sounded as [reh : nɛh] at the time of composition. The form tamriḥ (formerly tamreḥ) also occurs three times, and underwent the same change as riḥ. Hence tamriḥ : neḥ

(PP 2lef), tamrih : ceh (KCLB 35ba), and tamrih : camneh (PP 2lec) would all have been in rhyme at the time of composition. The form jamnih / jəmnih > cumnih / has undergone no change in its main syllable, and can still rhyme with radeh / rdeh > rtéh / [r^ɔtɨh] 'cart'. The form tih apparently changed from Middle Khmer /tɨh/ to early modern LR /tèh/, whence modern /təh/; presumably it could have rhymed with ceh (S 164a) only before the development of the modern standard language.

Our three-item residue consists of two rhymes with liquid finals, sarila / saril > sarəl / : ker(ti) / kir > kèer / (KK 16cb)⁸ and khjila / kjil > kcil / : saraserā / səɔrsir > saarsèer / (K 5ba),¹⁴ and one rhyme which appears to have undergone little but orthographical change: sammlīna (now sam⁺ēna 'voice') and phsīna (now phse⁺na 'to be different') at IMA 140ab, which seem to have rhymed as /səmleeŋ/ : /pseeŋ/ and hence to be reassignable to e.

The next largest group on Table 6 consists of 29 rhymes in which i is paired with an ā or a type graphic vowel other than ai ~ āya. These represent 16.9% of all imperfect i rhymes, and fall into several classes. One of these comprises 7 rhymes (6 from the late Cpā'pa srī, the other from the still later Cpā'pa prusa) with palatal finals, exemplified by miña / miŋ / : sam⁺ia'ña / samlaŋ / (S 141c/142a) and tica / təc / : tā'ca / dac / (P 32ba). These may be grouped with i : e rhymes with palatal finals, already discussed, and on identical grounds. One is tempted to dismiss the remaining rhymes as simply defective, but closer examination suggests that this may not be the case with the majority. Indeed, some of these rhymes may constitute the best evidence available for the early bifurcation of Middle Khmer /i/ into HR /i/ and LR /ə/ [e^ɔ ~ ə^ɔ]. In particular, four rhymes (including one duplication) consist of loans from Sanskrit or Pāli, the a member of which may have been given its Indic (= learned) value of [ə] instead of its Khmer value of [ɔ:],¹⁵ though the actual pronunciation in Cambodia may well have been [a^ʌ] --- that is to say, a low central vowel raised toward [ʌ]. These are:

IMA 8dc	<u>sthita</u> / <u>sthit</u> > <u>sthət</u> / ⁸ <u>bodhisatva</u> / <u>boodhisət</u> > <u>póothisat</u> /
T 63de	<u>citta</u> / <u>cit</u> > <u>cət</u> / <u>praṇipāta(na)</u> / <u>prənipət</u> > <u>pranəbat</u> /
HMI 17ab	<u>'āṇita</u> / <u>qaanit</u> > <u>qaanət</u> / <u>satva</u> / <u>sət</u> > <u>sat</u> /
HMI 62ab	<u>'āṇita</u> / <u>qaanit</u> > <u>qaanət</u> / <u>satva</u> / <u>sət</u> > <u>sat</u> /

More will be said regarding this type of change in a separate study of the low vowels of Middle Khmer. For the moment, let it be noted that two other rhymes containing Indic loans cannot be justified on the same basis as the four just given, inasmuch as their i members never

descended to the emergent LR: bita /bit > pit/ : rata(na) /rət > rat > roət/ (KC 57ab) and gita /git > kit/ : -ksatra /-ksət > -ksat/ (HMI 29d/30b). With these may be grouped gita /git > kit/ : mā'ta /mat > moət/ (S 75c/76a), which does not so far as is known contain an Indic loan. Regarding these three it seems best to withhold judgment. On the other hand, in the following eight cases (including two duplications) the rhyme may have pivoted on a raised variety of /a/ in imitation of, or at least set off by, the learned pronunciations just seen:

KC 10ab	citta /cit > cət/ pā'ta /?bat > bat/
IMA 123de	'issa /qih > qəh > qah/ (now 'a'sa) h _n āssa /nah/ (now ṛā'sa)
KCLA 56ab	pañhina /?bɔŋhin > baŋhən/ khjā'na /kʃjan > kcoən/
PP 56ab	pañhina /?bɔŋhin > baŋhən/ khjā'na /kʃjan > kcoən/
PUB 56ab	pañhina /?bɔŋhin > baŋhən/ khjā'na /kʃjan > kcoən/
S 76ba	citta /cit > cət/ mā'ta /mat > moət/
S 169c/170a	citta /cit > cət/ sñā'ta /sɳat/
P 56cd	cina /cin > cən/ dā'na /dan > toən/

In two rhymes modern editions of our texts show the orthographic form 'a'ta /qət > qat/ 'to withstand', which the original manuscripts must have represented as 'ita /qit > qət/:

S 67c/68a	citta /cit > cət/ 'ita /qit > qət/
P 62ab	jita /ʃit > cit/ 'ita /qit > qət/

This change is well attested, being already met with in the form 'issa (now 'a'sa) just cited from IMA 123d; it is also seen in the free variation in the modern language between 'ita /qət/ and 'a'ta /qat/ 'to lack, be missing'.¹⁶ Even this variation, however, cannot justify the 'ita /qit > qət/ : khnāta /knaat/ found first in the Kūna cau lṛæka (A) (24ed) and again in the Paṇṭām pitā and the Paṇṭām 'ū buka (also 24ed). These three occurrences, together with sina /sin > sən/ : da'na /dɔn > tun/ (S 79c/80a), must be regarded as defective.

The next group of imperfect i rhymes comprises 14 cases in which orthographic i is paired with ì, representing HR /ý/ [w^v] and LR /ÿ/ [ɿ ~ ə̃] in modern standard Khmer. These appear to pose no problems. Contrast is easily lost between their modern realizations on both registers, and there is no reason to assume contrast was formerly greater than today. The modern orthography in fact tolerates a number of alternant forms such as kritya /krèt/ and kritya /krýt/ while the dictionary of Guesdon, published just as the modern orthography was being promulgated, records hundreds of alternants such as niña /niŋ/ and nina /nýŋ/ 'with'. This small group of rhymes may therefore be exemplified by gita /git > kit/ : nañita /ŋŋyt > ŋŋýt/ (HMI 22ab, P 22ba), smita /smit > smèt/ : samriddhi /sɔmryt > samrýt/ (V 49ba), and sucarita /sucarit > socarèt/ : briddha /pryt > prýt/ (KK lba).

Lastly, Table 6 shows a residue of 6 imperfect rhymes in which i is paired with "other" orthographic vowels. Three of these include the anomalous form sila /səl/, previously discussed and reassigned to short i : khjila /kʃil > kcil/ : sila /sil > səl/ (R 12ab), ampila /qam?bil > qambəl/ : sila /sil > səl/ (HMI 77b/76d), and babila /ppil/ : sila /sil > səl/ (HMI 77cd). A fourth, pica /?bíc > bəc/ : cuca /cuc > coc/ (S208a), is probably referable to the muddling attendant upon palatal finals, also previously discussed. The other two may well have been defective: 'isa /qih > qah/ (now 'a'sa): dosa /dooh > tóoh/ (IMA 47a) and citta /cit > cèt/ : chuta /chut > chot/ (S 216a).

Table 7 shows that imperfect ū rhymes number 79 and have an average frequency of 1.5%. Of these 35 (44.3%) are rhymes in which orthographic ū is paired with w, while 33 (41.7%) have ū paired with au. Of the remainder 6 (7.6%) have ū paired with o, while 5 (6.3%) make up a small residue in which ū is paired with other orthographic vowels. It is worthy of note that imperfect ū rhymes are not found in the first, second, and fourth of our texts, that they are of minimal frequency in the third, fifth, sixth, eighth, and eleventh texts, and that they reach a peak frequency of 6.8% only in the fairly late Dūnmāna kūna. However, apart from this striking maximum, the rise and fall of frequencies for the other texts follows no recognizable pattern, and the most that can be said is that imperfect ū rhymes are less common in the early texts than in the later texts.

The 35 ū : w, rhymes are reflected in the modern language by 10 HR : HR rhymes, 16 LR : LR rhymes, and 9 HR : LR rhymes. These are exemplified by

KCLA 9ce byū(ha) /pjuu/⁷
 gwra /kúuər/

	total rhymes	w	au	o	other	total*	
Ker(ti) kāla	105	0	0	0	0	0	
Kūna cau	328	0	0	0	0	0	
Rājaneti	214	0	0	1	0	1	0.5%
Krama	154	0	0	0	0	0	
Hai mahājana (I)	337	0	2	1	0	3	0.9%
IMA 38	493	2	0	0	0	2	0.4%
Kūna cau lpeka (A)	297	3	2	0	1	6	2.0%
Vidhūrapaṇḍita	225	0	0	1	1	2	0.8%
Paṇṭāṃ pitā	295	3	2	0	0	5	1.7%
Kūna cau lpeka (B)	127	0	2	0	0	2	1.6%
Trīneti	380	0	2	0	0	2	0.5%
Dūnmāna khlwna	175	0	1	0	1	2	1.1%
Bākya cā'sa	97	0	1	0	1	2	2.1%
Hai mahājana (II)	324	3	2	1	0	6	1.9%
Paṇṭāṃ 'ū buka	291	3	2	0	1	6	2.1%
Dūnmāna kūna	251	10	6	1	0	17	6.8%
Srī	579	8	4	1	0	13	2.2%
Prusa	298	3	1	0	0	4	1.3%
'Ariyasatthā	194	0	6	0	0	6	3.1%
	5,164	35	33	6	5	79	1.5%

Table 7: Imperfect ū Rhymes.

DKn	2l	kūna /kòon/ sñwna /sɲuən/
HMII	48d/49b	tpñña /tbòŋ/ lwña /lúuəŋ/

In weighing the significance of these rhymes it is worth noting in the first place that the seventy lexical items they include show a decidedly limited range of finals: on the one hand, 38 items with /-n/ and 4 with /-ŋ/, on the other hand, 23 items with /-r/ and 5 with zero final. It is well known that in modern Khmer a final dental nasal or liquid may induce before itself a neutral phonetic glide: *jūna* /cuun/ [cu:ɓn], *kūna* /kòon/ [kɔ:ɓn]. It may be mentioned in the second place that the distribution of these seventy items according to their modern register is uneven. HR *ū* /uu/ and *w* /úuə/ account for 29 items (41.4%): 2 in IMA 38, 6 in the *Kūna cau lpeka* (A), 4 in the *Hai mahājana* (II), 4 in the *Dūnmāna kūna*, and 1 in the *Srī*. LR *ū* /òo/ and *w* /úu/ thus account for 41 items (58.6%), but are clustered in the later texts: 2 in IMA 38 and 2 in the *Hai mahājana* (II) but 16 in the *Dūnmāna kūna*, 15 in the *Srī*, and 6 in the *Prusa*. Although it can be assumed that this concentration of LR forms (23 *ū*, 17 *w* items) is fortuitous, it would appear to constitute particularly cogent proof that, as late as the time of the *Cpā'pa prusa*, Middle Khmer /uu/ (*ū*) had not yet bifurcated into modern HR /uu/ and LR /òo(w)/ or, perhaps it should be said, had not yet developed fixed registral contrast. Rhymes on the order of *dhūra* /dhuur > thuur/: *gwra* /guuər > kduər/ (KCLA 9fe) are not difficult to justify once we accept the possibility of [dhu:ɓr]: On the other hand, while a rhyme foreshadowing LR *ū* /òo/ from an early text such as *trīsūra* (Sanskrit *trīsūla*) /triisuur > trə̀əjsòor/: *gumwra* /gumnuuər > kumnuuər/ (IMA 26d/27b) may not surprise us, a similar rhyme from a late text such as *p'ūna* /pquun > pquon/: *khlwna* /kluuən > klūuən/ (DKn 56c/57a, P 45ab) is difficult to accept as normal, albeit imperfect, unless we see LR /òo/ as not yet fully established.

However, this reminds us of our next largest group of imperfect *ū* rhymes, namely the 33 in which *ū* is paired with *au*. These have already been listed in full and discussed in sufficient detail in an earlier paper,¹⁷ where it was shown that most of the *au* items in question presuppose modern HR /əw/ while most of the *ū* items presuppose modern LR *ūva* /òow/ [:w]. It was also shown that this type of rhyme increases in frequency, from earlier to later texts, with the diphthongization and lowering of *-ūva* from [u:w] to [:w] as the emergent LR became fixed. This observation would seem to modify somewhat, or at least place in better perspective, what has just been said regarding *ū* : *w* rhymes.

The next largest group of imperfect *ū* rhymes comprises 6 *ū* : *o* rhymes, as follows:

R	16de	grū /kruu/	:	bola /póol/ ¹⁸
HMI	74ab	dūka /tuuk/	:	goka /kóok/
V	5bc	drūña /truuŋ/	:	caṃkoña /caṃkaaŋ/
HMII	16cb	santūka /sandòk/	:	thoka /thaak/
DKn	33	kūna /kòon/	:	lamdona /lumtòon/
S	185c/186a	caṃbūka /campuuk/	:	soka /saaok/

The first thing we observe in these rhymes is that two of the \bar{u} members (santūka and kūna) are on the LR and three of the \bar{o} members (caṃkoña, thoka, and soka) are on the LR. This observation does not appear to be helpful, however. These rhymes are to be compared with the $\bar{I} : e$ rhymes already discussed. In particular we are reminded that, like the modern registral reflexes of Middle Khmer /ee/, those of /oo/ may differ considerably in tongue-height, HR /óo/ being often articulated as [ɔ:], LR /òo/ being often [ɔ:]. Moreover, in the orthographical forms sammlīna : p̄hsīna (now sam̄eña : p̄hsēna), already cited from IMA 38, we have a good indication that Middle Khmer /ee/ was heard as a lower-high [ɛ:] at the opening of the 18th century notwithstanding the fact that both of the forms in question were to develop LR nuclei in the modern language. This qualifies what was argued earlier on the basis of the repeated rhyme ralīna : dheña. The vowel of dheña may well have been [ɛ:] but not, after all, because it was evolving into the HR reflex of /ee/. It may have originally been on this level. In the case of $\bar{I} : e$ rhymes general conclusions, even of a provisional kind, were ruled out by what was found regarding the form ker(ti), which significantly reduced the number of rhymes remaining. In the case of the present $\bar{u} : o$ rhymes we may have sufficient reason to postulate that Middle Khmer /oo/ was characteristically articulate on the lower-high level as [ɔ:]. Particularly if the thesis is accepted that registral contrast for Middle Khmer /uu/ was not full established by the time of the Cpā'pa prusa, we are unable to force a justification of three of the six rhymes listed above by juggling the registral and preregistral forms of the orthographic vowels. Specifically, drūña /druuŋ > truuŋ/ : caṃkoña /cɔṃkooŋ > caṃkaaŋ/, santūka /sɔn̄?duuk > sandòk/ : thoka /thook > thaak/, and caṃbūka /cɔmbuuk > campuuk/ : soka /sook > saaok/ are plausible only if we interpret the pre-modern /oo/ as [ɔ:]; and if we admit this, we provide the rationale for all six rhymes including grū /gruu > kruu/ : bola /bool > póol/, dūka /duuk > tuuk/ : goka /gook > kóok/, and kūna /kuun (> kòon)/ : lamdona /lɔmdoon > lumtòon/. All six rhymes, in other words, paired [u:] with [ɔ:].

Our 5-item residue comprises 3 $\bar{u} : a$ (a') rhymes and 2 $\bar{u} : u$ rhymes, as follows:

KCLA	23fe	tūña /tòŋ/	:	daña /tɔŋ/
DKh	25d/26b	kūna /kòon/	:	la'na /lun/

PUB	47ef	mūla /muul/	:	ya'la /jul/
V	39ba	pradūsta /pratuuh/	:	khusa /khoh/
B	llab	yūra /juur/	:	dur- /tur-/

Although it was mentioned above the LR /o/ is often [ɔ:] in modern standard Khmer, we cannot assume that the first of these rhymes sounded originally as [tɔ:ŋ] : [dɔ:ŋ]. To do so would be to contradict our assumption that registral contrast for Middle Khmer /uu/ was not fully established as late as the time of the Cpā'pa prusa, an assumption which has proved useful thus far. Modern da'na, ya'la,¹⁹ and probably also la'na belong to an important group of lexical items which have o in Old Khmer but undergo lowering (e. g. phon /phooŋ/ > phaña /phaaŋ/ 'in company with, together'), and should hence be reassigned to the ū : o rhymes previously discussed. The original rhymes were almost certainly tūña /tuuŋ/ : doña /doonŋ/ [dɔ:ŋ], kūna /kuun/ : lona /loon/ [lɔ:n], and mūla /muul/ : yola /jool/ [jɔ:l]. In the case of pradūsta : khusa the two syllable nuclei have the same phonetic length but likewise show different degrees of openness. Despite its phonemic form, pradūsta /pratuuh/ 'to fault' reverts to a short vowel (Sanskrit praduṣṭa) under the influence of its final /-h/, while khusa /khuh > khoh/ had not yet manifested the LR. The rhyme was therefore [prəduh] : [khoh]. In the last rhyme yūra /juur/ 'to be long in time' is paired with the first syllable of durjana²⁰ /turjun/ 'wicked person'. The vowel of this syllable, with the gradual loss of final /-r/, had probably undergone compensatory lengthening by the time of the Bākya cā'sa, though it is difficult to say whether the /-r/ had entirely disappeared. With this reservation, the rhyme sounded as [ju:(r)] : [du:(r) > tu:].

We turn now to imperfect u rhymes, the types and distribution of which are laid out in Table 8.

The first and largest group of imperfect u rhymes comprises 98 items (82.3% of all such rhymes) in which ū is paired with shortened a. This is the one type of rhyme which cannot be satisfactorily analyzed from the data provided by the modern orthography. There was considerable vacillation between u and a in Middle Khmer times while original /ɔ/ [ɔʷ] after voiced initials was being raised to modern [ɔ] in the formation of the HR.²¹ As a result, continuity with the Old Khmer orthographic form of the items in question here was lost. As often as not the modern regularized orthography has fixed upon one symbol or the other in a wholly arbitrary manner. Pending closer examination of the manuscripts, therefore, we shall describe the data on hand without drawing any firm conclusions.

What is not shown on Table 8 is the frequency of u : a rhymes for each text. This averages 2.0% precisely. Individual averages below this point are far from what we should expect were the orthography

	total rhymes	ã	o	other	total
Ker(ti) kāla	105	3	0	0	3 2.9%
Kūna cau	328	2	0	0	2 0.6%
Rājaneti	214	0	0	0	0
Krama	154	0	0	0	0
Hai mahājana (I)	337	11	2	0	13 3.9%
IMA 38	493	10	0	0	10 2.0%
Kūna cau ipeka (A)	297	4	0	0	4 1.3%
Vidhūrapaṇḍita	225	1	1	1	3 1.3%
Paṇtām pitā	295	3	0	0	3 1.0%
Kūna cau ipeka (B)	127	3	0	0	3 2.4%
Trīneti	380	9	0	0	9 2.4%
Dūnmāna khlwna	175	6	3	0	9 5.1%
Bākya cā'sa	97	4	0	1	5 5.2%
Hai mahājana (II)	324	11	1	1	13 4.0%
Paṇtām 'ū buka	291	3	0	0	3 1.0%
Dūnmāna kūna	251	4	1	1	6 2.4%
Srī	579	8	2	2	12 2.1%
Prusa	298	11	4	1	16 5.4%
'Ariyasatthā	194	5	0	0	5 2.6%
	5,164	98	14	7	119 2.4%

Table 8: Imperfect u Rhymes.

unadjusted. They run, quite erratically, from the eighth text (the Vidhūrapaṇḍita, 0.4%) to the second (0.6%) and on the fifteenth and ninth (both 1.0%), the seventh (1.3%), seventeenth (1.4%), and the sixteenth (1.6%). Above this same point averages start from the thirteenth text (the Bākya ca'sa, 4.1%) and drop to the eighteenth (3.7%), the fourteenth and twelfth (both 3.4%), the fifth (3.3%), the first (2.9%), the nineteenth (2.6%), and the eleventh and tenth (both 2.4%); the IMA stands right at 2.0%. The random nature of these frequencies clearly rules out any correlation with the date of the texts.

As before, it is convenient to classify u : a rhymes according to the register of their modern reflexes. In this way we obtain four groups, as follows:

HR : HR rhymes number 30, and are exemplified by the following:

HMI	68ba	rum /rum/ ⁸ dham /dhom > thum/
IMA	143ab	guṇa /gun > kun/ lana /lon > lun/
KCLA	49g/50c	muna /mun/ bandha /bon > pun/
V	68ba	juṃ /jum > cum/ dham /dhom > thum/
T	12ba	manussa /mnuh/ yasa /joh > juh/
DKh	27b/26d	buka /buk > puk/ naraka /nərok > naruk/
HMI	5ab	guṇa /gun > kun/ damña'na /domɲon > tumɲun/
P	11bc	lupa /lup/ gra'pa /grɔp > krup/
A	24de	buta /but > put/ rama'ta /rmot > rmut/

While one naturally supposes that these rhymes were devised after the /ɔ > u/ shift and were meant to sound as [ɔ] : [u], it is not altogether certain that this was the case. For in the next group of rhymes we meet evidence that [ɔ] and [ɔ] could rhyme.

HR : LR rhymes number 8, as follows:

HMI	92ba	buka /buk > puk/ 'ākra'ka /qaakrɔk > qaakrak/
IMA	37a/96c	ñuṇa /huɲ/ paṇa /?bɔɲ > baɲ/

		ya'la /jɔl > jul/
T	69ab	khusa /khuh > khoh/ ra'sa /rɔh > ruh/
DKh	16ab	cuka /cuk > cok/ lala'ka /llɔk > lluk/
HMI	55ab	puṅya /ʔbun > bon/ ja'na /ʔɔn > cun/
DKn	64c/65a	sukha /suk > sok/ lāmaka /laamɔk > līɛmuk/
S	192a/191c	chuta /chut > chot/ ma'ta /mɔt > mut/
P	51cb	prusa /pruh > proh/ yasa /jɔh > juh/
A	35de	suṅa /suŋ > soŋ/ la'ṅa /lɔŋ > luŋ/

These rhymes are simply an amplification of the HR : HR rhymes already given, inasmuch as they occur in texts composed before Middle Khmer /u/ split into modern HR /u/ and LR /o/. The qualification previously expressed applies here as well.

LR : LR rhymes number 22, and are illustrated by the following:²²

KK	6ba	kum /kum > kom/ pārambha /ʔbaarɔm > baaram/
HMI	1ba	prusa /pruh > proh/ sappurasa /sɔpʔburɔh > sɔpborah/
IMA	98ba	sukkha /suk > sok/ 'ākṛaka /qaakrɔk > qaakrɔk/
T	62ed	pamruṅa /ʔbɔmrɔŋ > bamrɔŋ/ phea'ṅa /pɔɔŋ > pɔaŋ/
DKh	51ba	prusa /pruh > proh/ rapa'sa /rʔbɔh > rbɔh/
DKn	43ab	suṅa /suŋ > soŋ/ 'aṅga /qɔŋ > qaŋ/
S	192ab	chuta /chut > chot/ 'a'ta /qɔt > qat/
A	5de	cuṅa /cuŋ > coŋ/ ca'ṅa /cɔŋ > cɔŋ/

These are to be added to the eight HR : LR rhymes given above. The presence of /suk/ (Sanskrit sukha) and /pruh/ (Sanskrit puruṣa)

tends to legitimate the /muk/ : /qaakrɔk/ cited previously as a clue that [ɔ̄] and [ɔ̄] rhymed at this period. Indeed, it seems more certain than before that the \bar{a} members of these 30 rhymes did not have [ɔ̄] in the relevant syllable.

The next largest group of imperfect \bar{u} rhymes given on Table 8 comprises 14 rhymes in which \bar{u} is paired with \bar{o} . It is worth noting that the \bar{u} members of these rhymes are divided, in modern terms, between 6 HR and 8 LR items while the \bar{o} members are divided between 7 HR and 7 LR items. HR : HR rhymes are 4 in number, LR : LR rhymes 5, and rhymes of mixed register 5. The rhymes are:

HMI	84ab	manussa /mnuh/ ⁸ smoh /smoh > smaoh/ ²³
HMI	95cd	khusa /khuh > khoh/ smoh /smoh > smaoh/
V	52ab	luh /luh/ noh /noh > noh/
DKh	30ba	cuh /cuh > coh/ noh /noh > noh/
DKh	32d/33b	dluh /dluh > tluh/ noh /noh > noh/
DKh	33cb	khduh /kduh > ktuh/ noh /noh > noh/
HMI	51ba	dluh /dluh > tluh/ coh /coh > caoh/
DKn	49ba	cuh /cuh > coh/ smoh /smoh > smaoh/
S	199c/200a	susa /suh > soh/ kra'oḥ /krɔqoh > kraqaoh/
S	200ba	susa /suh > soh/ kra'oḥ /krɔqoh > kraqaoh/
P	22b/21d	juh /juh > cuh/ noh /noh > noh/
P	26d/27b	'usa /quh > qoh/ joh /joh > coh/
P	27cb	khusa /khuh > khoh/ joh /joh > coh/
P	57b/56d	cuh /cuh > coh/ knoh /knoh > knaoh/

It cannot escape notice that all 28 members of these rhymes have final /-h/. In the case of the \bar{u} members this latter is represented by

visarga in 8 items, by final -sa in 6 items; in the case of all 14 o members it is represented by visarga, the shortening effect of which permits rhyme with u. It seems clear in this light that we have here an extension of the ū: o rhymes previously discussed with the difference that, while the o items were meant to be articulated on the higher-mid level or higher, [o ~ ə], as before, the u items were articulated on the lower higher level: manussa /mnuh/ [m^ənəh], luh /luh/ [ləh], khusa /khuh/ [khəh], cuh /cuh/ [čəh]. It may be worth observing that 9 of the above rhymes are probably still valid: 4 of the rhymes with modern /nóh/ and the 5 rhymes in which /-oh/ [-o^h] is paired with /-aoh/ [-əh]. The 5 rhymes which are no longer valid are, on the one hand, /mnuh/ [m^ənəh] : /smaoh/ [sməh] and /tluh/ [t^hləh] : /caoh/ [čəh] and, on the other, /coh/ [čə^h] : /nóh/ [nəh], /qoh/ [ʔə^h] : /cóh/ [čəh], and /khoh/ [kə^h] : /cóh/ [čəh].

The last group of imperfect u rhymes shown in Table 8 comprises 7 rhymes in which u is paired with other graphic vowels. These are:

V	39ab	khusa /khuh > khoh/ ⁸ pradūsta /prəduuh > pratuuh/
B	11ba	dur- /dur- > tur-/ yūra /juur/
HMI	80ab	lupa /lup/ fā'pa /rap/
DKn	39	'aṅguya /qəŋguj > qəŋkuj/ kantəya /kəntəj > kəntəəj/
S	208a	cuca /cuc > coc/ pica /?bic > bəc/
S	216a	chuta /chut > chot/ citta /cit > cət/
P	34ab	trum /trum > trom/ tām /?dam > dam/

The first two of these have already been discussed under imperfect ū rhymes, while cuca : pica is adequately explained by the palatal final ā treated under imperfect i rhymes. The remaining four rhymes must be regarded as defective, and are probably the work of a careless copyist.

The main conclusions to which the present study leads may be restated as follows:

1. Imperfect i : āya rhymes demonstrate prosodic congruence between LR āj (i) and preregistrā əj (āya) and at the same time show that the registrā differentiation of Middle Khmer /i/ (i) antedated that of Middle Khmer əj (āya ~ ai).

2. Registral differentiation of Middle Khmer /əð/ (e > œ) was established after that for Middle Khmer /ii/ (Ī), and was not fixed as late as 1702 A. D.
3. It is probable that registral contrast between modern HR /éé/ and LR /ée/ (e) had appeared by the date of the Cpā'pa prusa.
4. It is probable that Middle Khmer /aa/ (ā) had bifurcated into HR /ééə > fiə/ and LR /aa/ by the time of the Cpā'pa srĪ, if not much earlier.
5. As recently as the time of the Cpā'pa prusa the registral reflexes of Middle Khmer /uu/ (ū) were not fixed.
6. The preregistral articulatory level of /ee/ and /oo/ (e, o) may have been characteristically lower-high [ɿ:] and [œ:], or may have ranged between lower-high and higher-mid, [ɿ: ~:] and [œ: ~u:].

NOTES

- 1 Philip N. Jenner, "The Relative Dating of Some Khmer Cpā'pa," to appear in Austroasiatic Studies, edited by Philip N. Jenner, Laurence C. Thompson, and Stanley Starosta. Oceanic Linguistics Special Publications, No. 13 (Honolulu: The University Press of Hawaii, 1974). The texts in question comprise 17 undated works of the cpā'pa /cbap/ genre plus No. 38 of the Inscriptions modernes d'Angkor (IMA 38), known as the Grande inscription d'Angkor Vat (K. 301) and dated śaka 1623 (=A. D. 1702 or 1701). The cpā'pa are homiletic works of surpassing interest from the linguistic as well as the cultural and literary points of view; IMA 38 is a devotional text no less interesting, included to provide one reference point in the chronological sequence. The titles of the cpā'pa are given on the accompanying tables. For the benefit of readers who have not seen my earlier papers it must be explained that there are two distinct texts known as the Cpā'pa hai mahājana and that the Cpā'pa kūna cau lpeka is a composite work, its first part consisting of a version of the Paṅtām pitā (itself a prototype of the Paṅtām 'ū buka), its second part consisting of a version of the Bākya cā'sa.
- 2 Philip N. Jenner, "The Final Liquids of Middle Khmer," to appear in a forthcoming issue of Zeitschrift für Phonetik, 1975, Heft 3/4.
- 3 Philip N. Jenner, "The Value of au and ai in Middle Khmer," in South-East Asian Linguistic Studies, edited by Nguyen Dang Liem.

Pacific Linguistics, Series C - No. 31 (Canberra: The Australian National University, 1973): 157 - 73.

- 4 Philip N. Jenner, "The Development of the Registers in Standard Khmer," in South-East Asian Linguistic Studies, 47-60.
- 5 Glosses are not furnished for the forms cited, inasmuch as we are concerned with a phonological problem. The examples are given first in an Indianist transliteration and again, between slants, in phonemic transcription. In the notation of modern standard Khmer the acute (´) marks HR, the grave (`) marks LR. for 14 otherwise ambivalent nuclei.
- 6 Vid. "Development of the Registers..."
- 7 All forms save those cited from IMA 38 are given in the modern regularized orthography. Unless otherwise indicated, all phonemic transcriptions represent the modern realization, for the reason already given.
- 8 The transliterations continue to show the modern orthography, but the first phonemic form represents Middle Khmer while the second represents modern Khmer. The symbols /ʔb, ʔd/ are used for the unitary imploded voiced labial and dental stops of Middle Khmer, which contrast with exploded /b, d/. This contrast is lost in modern Khmer, and /b, d/ are to be construed as implosive.
- 9 The parentheses in ker(ti), now /k`èer/, correspond to the daṇḍa-gḥāta, a diacritic "canceling" final written syllables. The Sanskrit form alone warrants our assuming that the earliest Khmer pronunciation of this item was [ki:r]: Perhaps under the influence of the orthographic -rt- sequence, this must have begun to be altered to [kɪr] by the date of the Cpā'pa ker(ti) kāla. For this text we can postulate /kiir/, rhyming as here with /piir/, and also /kir/ or even /kil/, rhyming with /saril/ (KK 16cb). Both pronunciations were possible during the early Middle Khmer period but with the progressive loss of final /-r/, with intolerance of short nuclei in open syllables, and with the development of the registers the original nucleus had to be lowered. In open syllables Middle Khmer /ii/ appears to have first dropped to higher-mid front [e:] and then to have undergone the typical centralization seen in such syllables as pī /ʔbii > b`əj/; in syllables closed by final /-r/, however, this change was arrested before centralization set in. That the same change could occur when the original vowel was short is shown by modern sira /s`èer/ (< Sanskrit śiras) and sirsa ~ sir(sa) /s`èer/ (< older Sanskrit śirṣa), for which see VK II:1352b, 1353a, 1353b. Note finally that the VK (I: 39b) sanctions kir(ti) /k`èer/ as a variant of ker(ti) and attributes both to a nonexistent Sanskrit *kirti.

- 10 See Saveros Pou and Philip N. Jenner, "Some Chinese Loanwords in Khmer," in JOS, XI (1973). 1: 45, item 148.
- 11 At least it can be noted that ramila /rmił/ 'to glance at' is an /r-/ derivative of an allomorph of mela /mǝl/ 'to look at' and may have had a long as well as a short vowel. The syllable bi- in the next rhyme is the initial of bicāraṇā (Sanskrit and Pāli vicāraṇa) 'investigation' and like other loans with the same prefix is commonly articulated [pi?] or even [pi:] rather than [pʰ?].
- 12 See "The Value of au and ai in Middle Khmer."
- 13 VK, II: 1437b.
- 14 For the disparate liquid finals see "The Final Liquids of Middle Khmer."
- 15 W.S. Allen, Phonetics in Ancient India (London: Oxford University Press, 1961), 57-61, notably 58 note 4.
- 16 VK, II: 1591b, 1772a; Joseph Guesdon, Dictionnaire cambodgien-français (Paris: Plon, 1930), I: 10a, 51a.
- 17 See "The Value of au and ai in Middle Khmer," especially Table 4, which includes two rhymes in -ova and -o from IMA 38 which are not taken into account here.
- 18 Rhymes of this type have been discussed in "The Final Liquids of Middle Khmer."
- 19 The form yola /jool/ occurs in IMA 12, dated in correspondence with 1628 A.D.; see Saveros Lewitz, "Inscriptions modernes d'Angkor 10, 11, 12, 13, 14, 15, 16a, 16b, et 16c," in BEFEO, LIX (1972): 221-49, in particular 226. Most of the forty-odd Middle Khmer inscriptions which use the word at all have the orthographic form yala, with the length of the syllable nucleus unmodified by a diacritic. However, in IMA 38, the only metrical text in this corpus, the same form is consistently in rhyme with short syllables, e.g. 'akusala /qakosal/ (97a/96c), tala /dal/ (97ab), samṅala /samnal/ (110c/109g), mandala /mundul/ (129ec), kravala /krawal/ (129ef). It is not without interest that modern editions of the earlier Kūna cau lṛeḳa and Paṅtām pitā have cūla /cool/ 'to approach, enter' where the Paṅtām 'ū buka has ya'la /jul/ 'to see'. In view of what has been said, we are led to assume that ya'la is the original, and is roughly contemporary with IMA 12.
- 20 This form with short u is given in two of my editions of the

Bākya cā'sa while that of the Institut Bouddhique gives dūrjana. The VK admits only the former.

- 21 See "The Development of the Registers..."
- 22 Table 8 specifies 98 items whereas only 97 have been accounted for here. One defective rhyme has been omitted.
- 23 In my transcription, the nongeminate /o/ of /smoh/ [smoh] represents a short allophone of Middle Khmer /oo/ before visarga as opposed to final -sa, while the /ao/ of modern /smaoh/ [smoh] represents a short allophone of /aao/ in the same environment.