The Japanese/Korean Vowel Correspondences

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1. Introduction

Korean and Japanese share cognate vocabulary, at least some of it the result of contact. Recent advances in the reconstruction of the vowel system of Proto-Japanese (including Ryûkyûan) enable us to clarify and distinguish the vowel correspondences that hold for later loan vocabulary as well as earlier cognate material. Various types of evidence point to a PJ system of seven vowels, including two mid vowels, **e* and **o*, which rose in most positions to merge with **i* and **u* in main island varieties; and a high central vowel **ɨ*, which merged with the ancestor of Old Japanese *o*. Evidence for the latter comes from variable outcomes in contractions with **i*. The seven vowel system for Japanese is reconstructed entirely on Japanese-internal grounds (primarily internal reconstruction and dialect comparison), but it turns out to have interesting consequences for the comparative study of Japanese and Korean.

The paper is organized as follows: Section 2 presents our reconstruction of the vowels of Proto-Japanese based on internal criteria. Section 3 focuses on the comparative consequences of this reconstruction, addresses the issue of dating cognate vocabulary, and proposes a new view of the pre-Middle Korean vowel system.

2. The Vowels of Proto-Japanese

In this section we motivate the reconstruction of short vowels for Proto-Japanese in (1), following Frellesvig and Whitman (forthcoming a, b).

(1) *i *ɨ *u
*e *ə *o
*a

The correspondences between the PJ vowels we reconstruct and the vowels and postconsonantal diphthongs of OJ are shown in (2a).[1] Until recently, a four vowel hypothesis (4VH) has been dominant, holding that PJ had only four primary vowels (e.g. Miller 1967, Ohno 1977, Matsumoto 1974, 1984, Whitman 1985), /*i, *a, *u, *ə/, reflected as OJ /i, a, u, o/. (2b) gives the correspondences between the PJ four vowel system and OJ.

(2) a. Seven vowel hypothesis (7VH)

PJ	OJ
*i	*i*
*e	*i, ye*
*a	*a*
*o	*u, wo*
*u	*u*
*ɨ	*o*
*ə	*o*

Pre-OJ	OJ
*ui	*wi*
*ɨi	*wi*
*ai	*e*
*əi	*e*
*ɨɨ	*ye*
*ia	*ye*
*iə	*ye*
*uɨ	*wo*
*ua	*wo*
*uə	*wo*

b. Four vowel hypothesis (4VH)

PJ	OJ
*i	*i*
*a	*a*
*u	*u*
*ə	*o*

Pre-OJ	OJ
*ui	*wi*
*əi	*wi*
*ai	*e*
*ia	*ye*
*iə	*ye*
*uə	*wo*
*ua	*wo*

[1] We phonemicize the '*kô/otsu rui*' syllables as exemplified in the following, with /Cwi/ for Ci_2, /Cwo/ for Co_1, /Cye/ for Ce_1, and /Ce/ for Ce_2 (aligning Ce_2 with neutral *Ce*): mi_1 /mi/ 'three', *ti* /ti/ 'thousand', mi_2 /mwi/ 'body'; ko_1 /kwo/ 'child', *po* /po/ 'ear (of grain)', ko_2 /ko/ 'this'; me_1 /mye/ 'woman', *te* /te/ 'hand', me_2 /me/ 'eye'.

The 4VH claims that the OJ nuclei *wi, e*, *ye*, and *wo* are **all** secondary, resulting from contractions of vowel sequences as in (3):

(3) a. *ui > wi **waku-iratukwo* 'young-honored.male' > *wakwiratukwo*
**əi > wi **əpə-isi* 'big-stone' > *opwisi* Proper name
**əi > e **tənə-iri* 'palace-enter' > *toneri* 'palaceservant'
**ai > e **taka-iti* 'high-market' > *taketi* Proper name
b. *uə > wo *situ-ori* 'native.weaving-weave' ~ *sitwori* 'type of cloth'
**ua > wo **kazu-ap-* 'number-join' > *kazwope-* 'count'
**ia > ye **saki-ari* 'bloom-is' > *sakyeri* 'is blooming'
**iə > ye **pi-əki* 'sun-put' > *pyeki* Proper name

So-called 'apophonic nouns' give further support for the secondary origin of the nuclei *wi* and *e* (but not *ye* and *wo*):

(4)	freestanding form	compound form
wi ~ u	*mwi* 'body'	*mu-kapari* 'hostage' ('body-substitute')
wi ~ o	*kwi* 'tree'	*ko-dati* 'grove' ('tree-stand')
e ~ o	*se* 'back'	*so-muku* 'turn' ('back-face')
e ~ a	*me* 'eye'	*ma-pye* 'front' ('eye-side, direction')

There are various proposals about the origin of noun apophony (Yoshitake 1928, Murayama 1962, Whitman 1985); all hold that the compound form directly reflects the root vowel, while freestanding *wi* and *e* originate from contractions like (3a), e.g. *mwi* 'body' < **mui*; *me* 'eye' < **mai.*

Perhaps the strongest argument for the 4VH is the relative infrequency of *Cwi, Ce*, *Cye*, and *Cwo*, especially outside of morpheme-final position. However we take the position (2.2) that this distribution has two sources: *Cwi* and *Ce* truly are secondary, but final *ye* and *wo* reflect primary vowels.

2.1 Two sources for o: PJ *ə, *ɨ > OJ o

The 7VH (2a) holds that OJ *o* is the reflex of two PJ vowels, which we reconstruct as **ɨ* and **ə*, a high and a mid central vowel respectively. The basic observation underlying this proposal is evident in (3-4) above: OJ *o* takes part in two alternations, *o* ~ *wi* and *o* ~ *e*, reflecting two outcomes of contraction with **i*. Of these *o* ~ *e* has previously been thought to be an irregular and/or nonstandard variation of *o* ~ *wi*, but we argue instead that the alternation *o* ~ *e* in simply reflects a different source for OJ *o*, as shown in (5); pre-OJ **ɨ* and **ə* merged after these contractions took place, eventually resulting in OJ *o*.

(5) a. **ɨ* > *o* ~ *wi* < **ii*
b. **ə* > *o* ~ *e* < **əi*

Below we review relevant cases of the two alternations *o* ~ *e* and *o* ~ *wi*.

2.1.1 Lexical Contraction

The examples in (6) seem to be the only solid cases of lexical contraction of an ancestor of OJ *o* with **i*. They do not show **əi* > *wi* to be regular and **əi* > *e* irregular: there is but one case of the former versus two of the latter, supporting the distinct PJ sources in (7).

(6) a. *opwisi* (cf. (4.a))
b. *toneri* (cf. (4.a)), *wenu* 'puppy' (cf. *wo* 'small', *inu* 'dog')

(7) a. **ipi-isi* > *opwisi*
b. **tənə-iri* > *toneri*, **wə-inu* > *wenu*

2.1.2 Nominal Apophony

Among the monosyllabic apophonic nominal stems, OJ *o* takes part in two alternations, *o-* ~ *wi* and *o-* ~ *e*. (8) lists these alternations for monosyllabic stems.[2] Again, the distribution is not persuasive for *o* ~ *wi* < **əi* being regular; instead, two distinct sources should be reconstructed as in (9).

(8) a. *ko-* ~ *kwi* 'tree'; *no-* ~ *ni* 'load'; *po-* ~ *pwi* 'fire';
so demonstrative ~ *si* 3rd sg. personal pronoun.
b. *mo* 'algae; ?seaweed' ~ *me* '(edible) seaweed'; *so-* ~ *se* 'back';
yo ~ *ye* 'branch'; *yo-* ~ *ye-* 'good'.

(9) a. **Cɨ* > *Co-* ~ *Cwi* < **Cɨi*
b. **Cə-* > *Co-* ~ *Ce* < **Cəi*

2.1.2 Verb(al) Apophony

The basic stem of the secondary verbs, the Nidan verbs, is thought to derive from contraction of a root or stem final vowel with an **i* (either a derivational morpheme, possibly going back further to **-Ci-*, or the infinitive formant). When the source is reflected independently in OJ, Nidan verbs take part in alternations similar to the apophonic nouns:

[2] Note that *-wi* is neutralized as *-i* after coronals.

(10)		Nidan verb base
-u- ~ -wi-	*sabu-* ‘lonely’	*sabwi-* ‘get desolate, fade’ (< **sabu-(C)i*)
-o- ~ -wi-	*opo-* ‘big’	*opwi-* ‘get big; grow’ (< **ipi-(C)i*)
-a- ~ -e-	*aka*(-) ‘red’	*ake-* ‘redden, lighten’ (< **aka-(C)i*)

Nidan verbs do not regularly take part in the alternation *-o-* ~ *-e-*, but it is possible to identify a few pairs exhibiting this alternation (11). Of these, only *komor-*, *kome-* are true lexical verbs. *Se-* is the basic stem of ‘to do’; its root, *so*, is reflected as a fossilized imperative in prohibitive *na-...-so*. *-Koso* is used as imperative; *to* is the copula infinitive and *-te* the derived gerund formant and adverbializer (see Frellesvig 2001:12-16). These roots should be reconstructed as in (12a) and the alternations understood as in (12b).

(11) *komor-* ‘hide’ (intr.) ~ *kome-* ‘hide, enclose’; *so* ~ *se-* ‘do’;
-koso ~ *-kose-* ‘do for me’; *to* copula ~ *te* adverbializer.

(12) a. **kəmə,* **sə*, **kəsə*, **tə*
b. **(-)Cə* > *(-)Co* ~ *(-)Ce-* < **(-)Cə-(C)i*

2.2 Proto-Japanese *e, *o

Contra the 4VH, the evidence for the OJ nuclei *wo* and *ye* being diachronically secondary is far less persuasive than for *wi* and *e*. While syllables with *wo* and *ye* are also relatively infrequent in the OJ lexicon, the vast majority cannot be derived from lexical contractions of the sort in (3b). As noted above, *wo* and *ye* do not take part in alternations involved in nominal or verbal apophony. This has led to hypotheses that these nuclei, as opposed to *wi* and *e*, to a large extent reflect two primary PJ vowels, reconstructed as **o* and **e*. See Hattori (1978-9), Hayata (1998, 2000), Serafim (1999) for proposals based on internal and comparative dialect evidence for reconstruction of PJ **o,* **e*. Most recently, the thorough study of Miyake (2003) provides philological evidence for this claim.

Previous reconstructions of front and back mid vowels in PJ have assumed unconditional raising to high vowels (PJ **o* > OJ *u*, **e* > *i*) or raising conditioned by length; we hypothesize that PJ **o* and **e* rose to give *wo* and *ye* in ‘final’ position, but *u, i* elsewhere (13). Dialects seem to have differed in the environments and conditions for whether the outcome was ‘complete’ (> *u, i*) or ‘incomplete’ (> *wo, ye*) raising.

(13) **o* > *wo* in final position; *u* elsewhere
**e* > *ye* in final position; *i* elsewhere

Internal evidence for raising of **o* may be found in variation between *Cu* and *Cwo* within the OJ lexicon (14), and in dialectal correspondences between Central OJ *Cu* and Eastern OJ *Cwo* (20). See Hayata 1998, Matsumoto 1995:79ff, 132f for *wo~u* forms, also Thorpe 1983.

(14) **yo(-)ri* *ywo(-)ri* 'from' ~ *yuri* 'behind; from'
**mo(-)ko* *mwokwo* 'partner, bridegroom' ~ *mukwo* (> EMJ *muko*)

(15)	Central OJ		Eastern OJ
**yo*	*ywo* 'night'	::	*yu-* (*yutoko* 'night bed')
**no*	*nwo* 'field' (?~ *numa* 'marsh')	::	*nu-* (*nu-no* 'field-Gen.')
**-o*	*-u* finite primary verb ending	::	*-u* ~ *-wo*

OJ internal evidence for **e* may be found in variation between *ye* and *i* within OJ, see (16), although examples are few, and in dialectal correspondences between Central OJ *-i* and Eastern OJ *-e*, or conversely, Central *ye* and Eastern *i* (17). These examples highlight the fact that different dialects had different criteria for complete and incomplete raising.

(16) **me* *mye* 'woman' ~ *-mi-* (*womina* 'young woman')
**e* *ye* 'placenta' ~ *i-* (*iro* 'of same mother')

(17)	Central OJ		Eastern OJ
**te*	*(mi)ti* 'road'	::	*te* (*miti-no-naga-te*)
**ke*	*-ki* adj.Adn.	::	*-ke*
**ipe*	*ipye* 'house'	::	*ipi*
**kape*	*kapyer-* 'return'	::	*kapir-*

In addition, Ryûkyûan-Japanese comparative evidence gives support for reconstructing PJ **e* (Hattori 1976, 1979-80, Thorpe 1983) where proto-Ryûkyûan **e* corresponds to OJ *i* (23); the PR reconstructions follow Thorpe (1983).

(18) OJ /i/	::	PR **e* < PJ **e*
midu 'water'	::	**medu*
oyobi 'finger'	::	**UyUbe* (*U: PR *u or *o)
piru 'garlic'	::	**peru*
kizu 'wound'	::	**kezu*
idu 'wh-'	::	**edu*
pidi 'elbow'	::	**pedi*

2.2.1 Mid Vowel Raising and Demonstratives

As is well known, the Japanese and Korean systems of demonstrative/interrogative pronouns are structurally identical, with a three way distinction among the demonstratives (19). There is also a good form fit between MK *kɨ*, *tyə*, *ə- ~ ənu* and EMJ *ko*, *so*, *i- ~ idu-*. However, the semantics do not match in two of the sets: MK mesial *kɨ* corresponds to EMJ proximal *ko*, and MK distal *tyə* to EMJ mesial *so*. Raising of PJ mid vowels offers support for a scenario of changes which has led to this situation.

(19)	proximal	mesial	distal	interrogative
MK	*i*	*kɨ*	*tyə*	*ə- ~ ənu*
EMJ	*ko*	*so*	*ka*	*i- ~ idu-*

First of all, it is less well known that the EMJ system is an innovation and that OJ in fact, as demonstrated in detail by Hashimoto (1966, 1982), only has a two term plus interrogative system : *ko* (speaker), *so* (non-speaker), *i- ~ idu-* (interrogative) (20). The OJ system is entirely speaker based (speaker versus nonspeaker), with no direct reference to hearer, so the semantics are also quite different from the later system. The *ka* usually posited for OJ is a product of projecting the EMJ system unto logographically written portions of the OJ text corpus. In OJ, *ka* was not a productive member of the demonstrative system. Early precursors of the innovative EMJ system are attested three times in OJ: *ka* (as distinct from the adverb *ka* 'this way'), is attested at most twice, both in dialect poems (M 14.3565, 20.4384) and the long form, *kare*, is found once (M 18.4045). Other *ka-* based demonstratives are not attested until EMJ.

(20) OJ demonstratives	speaker	nonspeaker	interrogative
	ko	*so*	*i- ~ idu-*

In addition to the productive OJ system, there is some evidence for an earlier proximal demonstrative *i-*, lost by OJ times but vestigially retained in *ima* 'now' < *i* 'this' + *ma* 'interval', and perhaps also as the OJ term of address *i* 'you'. We propose that the OJ system evolved from a PJ system with proximal **i* and interrogative **e*, in addition to mesial and distal, see (21) below. What upset the PJ system, we suggest, was raising of pre-OJ /*e/, resulting in homonymy between pre-OJ proximal **i* (< PJ **i*) and interrogative **i* (< PJ **e*), a stage we represent as pre-OJ(a). We suggest that this 'pernicious homonymy' was resolved by proximal **i* being discarded as a productive member of the system and mesial **kɨ* and distal **sɨ* being reanalyzed as speech event participant and nonparticipant respectively: pre-OJ(b).

This was subsequently reanalyzed as speaker and nonspeaker, respectively, the system exhibited by OJ. The OJ system was later augmented to include a distal (*ka*), giving the EMJ and later system.[3]

(21)	PJ	proximal **i*	mesial **kɨ*	distal **sɨ*	interrogative **e*
	pre-OJ(a)	proximal **i*	mesial **kɨ*	distal **sɨ*	interrogative **i*
	pre-OJ(b)	participant **kɨ*	nonparticipant **sɨ*		interrogative **i*
	OJ	speaker *ko*	nonspeaker *so*		interrogative *i- ~ idu-*
	EMJ	proximal *ko*	mesial *so*	distal *ka*	interrogative *i- ~ idu-*

The PJ demonstrative system we reconstruct is a good fit, phonologically and semantically, with the MK system (22):

(22)	proximal	mesial	distal	interrogative
MK	*i*	*kɨ*	*tyə*	*ə*
PJ	**i*	**kɨ*	**sɨ*	**e*

2.3 Summary

Recapitulating, we propose the following seven vowel system for PJ. It is worth noting that (23) is a typologically well-attested system. Crothers (1978) reports that vowel system type 7:2 (seven vowels with two of the central vowels /ɨ/, /ə/, or /ü/) is the fifth most common in his sample of vowel systems, and the most common type among seven vowel systems, with 14 exemplars.

(23) ***i** ***ɨ** ***u**
***e** ***ə** ***o**
***a**

[3] A change such as the one we propose for pre-OJ of the mesial in a three way demonstrative system to replace the original proximal is attested in the transition from classical to vulgar Latin, with mesial *iste* replacing proximal *hic* of the original three way system of proximal *hic*, mesial *iste*, and distal *ille* (see Väänänen 1963: 128-9).

3. The Japanese-Korean Vowel Correspondences

The system in (23) is not dissimilar to Late Middle Korean (24):

(24) LMK Vowels (15th century; transcription follows Lee 1972a)

i	ɨ	u
	ə	o
	ʌ	
	a	

The main difference between the two systems reflects a peculiarity of the LMK inventory noted by many previous researchers: a four-way height distinction, with no non-high front vowel. 3.1 shows how certain vowel correspondences between Japanese and Korean fall out under the 7VH for OJ. 3.2 examines the structural disparities between the two systems.

3.1 The Basic Correspondences

We propose the basic vowel correspondences in (25):

(25)	MK		OJ		PJ
a.	i	::	i	<	*i
b.	ɨ	::	o	<	*ɨ
c.	u	::	u	<	*u
d.	yə < *e	::	i, ye	<	*e
e.	ə	::	o, a	<	*ə, *a
f.	o	::	u, wo	<	*o
g.	ʌ	::	o, a	<	*ə, *a
h.	a	::	a	<	a

3.1.1 Correspondences for OJ /o/

In addition to the well known correspondences involving Middle Korean *ɨ* :: OJ *o* (25b), a number of convincing lexical pairs support the correspondence MK ʌ :: OJ *o* (Kôno 1967/1979: 561, Martin 1966: 220) in (25g):

(26)	MK *ɨ*	::	OJ *o*	PJ **ɨ*
a.	*kɨ* 'that' (mesial)	::	*ko* <	**kɨ* (demonstrative; cf. 2.2.1))
b.	*misi-* 'wh(at)'	::	*mosi* <	**misi* (conjectural adverb)
c.	*timir-* 'rare'	::	*tomo-si* <	**tɨ mɨ* - 'scarce'
d.	*tir-* < **tiri-* 'hold,lift'	::	*tor-* <	**tir-* 'take'
e.	*miri-t* 'all'	::	*moro-* <	**miri* 'all'

(27)	MK ʌ	::	OJ *o*		PJ *ə*
a.	*tʌrk* ‘chicken’	::	*tori*	<	**tər(-i)* ‘bird’
b.	*kʌth-* ‘alike’	::	*koto-si*	<	**kətə-* ‘resemble’
c.	*mʌt* ‘eldest, chief (of kin)’	::	*moto*	<	**mətə* ‘base, origin’
d.	*nʌr-* ‘fly’	::	*nor-*	<	**nər* ‘ride’
e.	*kʌβʌr* ‘county’	::	*kopori*	<	**kəpər(-i)* ‘county’ (loan)

These two correspondence sets show us that two PJ vowels were involved: OJ *o* < PJ **i* :: MK *i*, and OJ *o* < PJ **ə* :: MK ʌ. The same two sets of correspondences emerge in OJ correspondences for MK words in final /r/ or /y/:

(28)	MK *ir*		OJ *o-, wi*		PJ **i y*
a.	*pir* ‘fire’	::	*po-, pwi*	<	**piy* ‘fire’
b.	*miri-* < **mirir-* ‘withdraw’	::	*mo, mwi-*	<	**mi* -‘turn about’
c.	*kirih* ‘stump, counter for trees’	::	*ko-, kwi*	<	**kiy* ‘tree’

(29)	MK ʌ*r*		OJ *e*		PJ ** əy*
a.	*mʌr* ‘seaweed’	::	*mo, me*	<	*mə(y)* ‘seaweed’
b.	*pʌyam* ‘snake’	::	*pemi*	<	*pəym(-i)* ‘snake’
c.	*pʌy* ‘boat’	::	*pe*	<	*pəy* ‘boat (prow)’

The seven vowel hypothesis accounts directly for the existence of two sets of Korean correspondences for OJ *o*. Note that the OJ apophonic nouns ‘fire’ and ‘tree’ in (28) behave exactly as predicted on internal grounds by the hypothesis that their nuclear vowel results from PJ **i*. Likewise, the vowel in (29a) alternates between *e* and *o*, suggesting on internal grounds the PJ shape ** *mə(y)* confirmed by the MK comparison.

3.1.2 Correspondences for PJ *e and *o

Under the mid vowel raising hypothesis, MK *o* is expected to correspond to OJ u, except in final position. This is borne out:

(30)	MK *o*	::	OJ *u*	PJ **o*
a.	*kokori* ‘stem’	::	*kuku-*, *kukwi,* ‘stem’	?< **kokor*
b.	*oy* ‘melon’	::	*uri* ‘melon’	?< **ori*
c.	*tok* ‘jug’	::	*tuki* ‘jug’	?< **toki*
d.	*kom* < *koma* ‘bear’	::	*kuma* ‘bear’	?< **koma*
e.	*mom* ‘body’	::	*mu- mwi* ‘body’'	?< **mo(C)(i)*
f.	*moyh* ‘mountain’	::	*mure* ‘mountain’	?< **more*
g.	*kop-*/*koB-* < *kopʌ-* ‘beautiful’	::	*kupasi-* ‘beautiful’	< **kopa-*
h.	*moh* ‘corner, side’	::	*mwo* ‘direction’	< **mo*
i.	*-to* ‘also, too’	::	*two* ‘outside, other’	< **to*

In (30a-f) there is no Japanese-internal evidence that non-final /u/ results from PJ *o, although the vowel shape is consistent with this source. In (g), there is evidence for OJ u < *o: the original vowel survives in the Kami Nidan verb *kwopwi-* 'love, long for'; it is raised in stem-nonfinal position in the adjective *kupasi-* 'fine, beautiful'.

The MK correspondence for OJ *i/ye* < PJ ***e*** is less clear; as noted above, the MK inventory lacks a non-high front vowel. Following a suggestion from Leon Serafim, brought to our attention by Marc Miyake, we hypothesize a front mid vowel ***e*** for pre-MK that was centralized to merge with *ə*. In absolute initial position, this vowel appears as MK *ə*, but in non-initial position it palatalized the preceding consonant before being centralized, resulting in syllables of shape *Cyə* in MK. The predicted OJ correspondence for this vowel is *i* in nonfinal (31a-e), *ye* in final position (f-g):

(31)	MK yə	::	OJ *i*		PJ ***e***
a.	*syəm* 'island'	::	*sima* 'island'	?<	****syema***
b.	*syəy-* 'whiten' cf. *hʌy-/hɨy-* 'white'	::	*sirwo* 'white'	?<	****sero***
c.	*nyəy-* 'go'	::	*nige-* 'flee'	?<	****nenk(V)-***
d.	*pyərok* 'flea'	::	*piru* 'leech'	<	****peru***
e.	*ə-* 'wh'	::	*i-* 'wh'	<	****e-***
f.	*myəniri* 'wife'	::	*mye, mi-* 'woman'	<	****me***
g.	*cyəs* 'breasts'	::	*ti, titi* 'breasts'	?<	****te***

Previous treatments of correspondences like those in (31) have posited primary ***i*** for both languages (Lee 1959, Whitman 1985). But (d-e) give Ryûkyûan evidence for PJ ***e***, while (f) gives Japanese-internal evidence for *e, as it shows *ye*, not *i*, in the position predicted by the mid vowel raising hypothesis. Our proposal provides a more balanced vowel system for pre-MK and makes sense of this correspondence set.

3.2 Pre-OJ Mid Vowel Raising in Japanese Loans from Korean

The mid vowel raising hypothesis enables us to distinguish loans which entered Japanese after raising from material present in the language at the preraising stage:

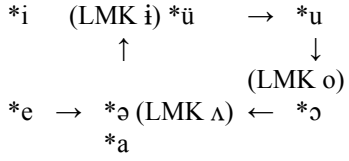
(32)	**MK**		**J Preraising**	**Postraising**
a.	*syəm* 'island''	::	*sima* 'island'	*sema* (*Nihon shoki*)
b.	*kyən* 'silk' (Sino-Korean)	::	*kinu* 'silk'	*ken* (Sino-Japanese)
c.	*tyər* 'Buddhist temple'	::		*tera* 'Buddhist temple'
d.	*puthə* 'Buddha' < ****putɨhyə***	::		*potoke* 'Buddha'
e.	*Kokuryə* 'Koguryŏ' (SK)	::	*Kokuri*	*Kure* 'Koguryŏ'
f.	*kom* < *koma* 'bear'	::	*kuma* 'bear'	*koma* Koguryŏ ethnonym
g.	*mosi* 'ramie'	::	*karamusi* '(Korean) ramie'	

Some of the J preraising forms in (32) are certain (b, e) or probable (g) loans, but the raising diagnostic shows them to be older than their counterparts in the right column.

3.3 A Vowel Shift in EMK?

The unbalanced character of the LMK vowel system in (24) has attracted the attention of Korean linguists for over 40 years. One influential proposal is the 'vowel shift' hypothesis of Lee Ki-moon (1972a, b), which posits a series of chain-type shifts from the hypothesized Early Middle Korean system in (33):

(33) The post-EMK Vowel Shift (Lee 1968, 1972a,b)



The vowel shift hypothesis has been criticized by a number of linguists (Kang 1980, Kim 1993, Martin 2000, Vovin 2000). Despite the superficial structural similarity between (33) and the reconstructed PJ system in (23), the vowel correspondences we have discussed give no support for (33). (33) predicts correspondences of the type EMK **e* > LMK *ə* :: OJ *i* < PJ **e*, but all correspondences of this type in (31) involve LMK *Cyə*, not *Cə*, supporting our hypothesis that only the former descends from a front vowel. Similarly, (33) predicts EMK **u* > LMK *o* :: OJ *u* < PJ **u*, but (30) shows that LMK *o* corresponds to OJ *u* only in raising environments; elsewhere, it corresponds to OJ *wo*.

4. Conclusion

We have argued for a Proto-Japanese system of seven vowels, three of which (**ɨ*, **e*, and **o*) were completely or largely eliminated by mergers by the period of the central dialect of OJ. We have shown how this system makes sense of similarities between the demonstrative systems of Korean and Japanese and a number of JK vowel correspondences.

Abbreviations

PJ	Proto-Japanese (including Ryûkyûan)
OJ	Old Japanese (700-800)
EMJ	Early Middle Japanese (800-1200)
EMK	Early Middle Korean (900-1400)
LMK	Late Middle Korean (1400-1600)
PR	Proto-Ryûkyûan

References

Crothers, John. 1978. Typology and universals of vowel systems. In Green berg, J. (ed.) *Universals of Human Language, Volume 2: Phonology*, 93-153. Stanford: Stanford University Press.

Frellesvig, Bjarke. 2001. A common Korean and Japanese copula. *Journal of East Asian Linguistics* 10: 1-35.

Frellesvig, Bjarke and John Whitman. Forthcoming.a. The vowels of proto-Japanese. Japanese Language and Literature (spring 2004).

Frellesvig, Bjarke and John Whitman. Forthcoming.b. Evidence for seven vowels in proto-Japanese. Proto-Japanese, Proceedings from ICHL 2003 (2005).

Hashimoto, Shirô. 1966. Kodaigo no shiji-taikei: Jôdai o chûshin ni. *Kokugo Kokubun* 35: 329-41.

Hashimoto, Shirô. 1982. Shijigo no shiteki tenkai. *Kôza nihongogaku*, vol. 2: Bunpôshi, ed. by Kenji Morioka et al., 217-40. Meiji Shoin.

Hattori, Shirô. 1978-9. Nihonsogo ni tsuite 1 - 22. *Gekkan Gengo* vols. 7/1 - 7/3, 7/6 - 8/12.

Hayata, Teruhiro. 1998. Jôdai nihongo no onsetsu kôzô to o-retsu kô-otsu no betsu (The Syllable and the Distinction between o_1 and o_2 in Old Japanese). *Onsei Kenkyû/Journal of the Phonetic Society of Japan* 2: 25-33.

Hayata, Teruhiro. 2000. The Liquid and stem-final vowel alternations of verbs in Ancient Japanese. *Gengo Kenkyû* 118: 5-27.

Kang, Shinhang. 1980. *Kyerim yusa 'Koryŏ pang'ŏn' yŏngu*. Seoul: Sŏng-gyun'gwan University Press.

Kim, Chuwŏn. 1993. *Moŭm chohwa ŭi yŏngu*. Kyŏngsan: Yŏngnam University Press.

Kôno, Rokurô. 1967/1979. *Kôno Rokurô Chosakushû* 1: 555-562. Tokyo: Heibonsha.

Lange, Roland A. 1973. *The Phonology of Eighth-Century Japanese*. Tokyo: Sophia University.

Lee, Ki-Moon. 1959. On the breaking of *i in Korean. *Asia Yengwu* II.2.

Lee, Ki-Moon. 1972a. *Kwugŏ-sa kaesŏl*. Seoul: Minjung Sŏgwan.

Lee, Ki-Moon. 1972b. *Kwugŏ ŭmun-sa yŏn'gu.* Seoul: Han'guk Munhwa Yŏn'gu-so.

Martin, Samuel E. 1966. Lexical evidence relating Korean to Japanese. *Language* 42.2: 185-251.

Martin, Samuel E. 1987. *The Japanese Language Through Time*. Yale University Press.

Martin, Samuel E. 2000. How have Korean vowels changed through time.

Korean Linguistics 10: 1-60
Matsumoto, Katsumi. 1974. Kodai Nihongo boin soshiki kô: naiteki saiken no kokoromi. *Kanazawa Daigaku hô-bungakubu ronshû*: bungaku hen 22: 83-152.
Matsumoto, Katsumi. 1984. Gengoshi no saiken to gengofuhen. *Gengo Kenkyû* 86: 5-32.
Matsumoto, Katsumi. 1995. *Kodai Nihongo boinron : Jôdai tokushu kanazukai no saikaishaku*. Tokyo: Hitsuji Shobô.
Miller, Roy A. 1967. *The Japanese Language*. Chicago: Chicago University Press.
Miyake, Marc. 2003. Philological evidence for *e and *o in Pre-Old Japanese. *Diachronica* 20: 81-136.
Murayama, Shichirô. 1962. Nihongo to kôkurigo no sûshi - Nihongo no keitô mondai ni tuite. *Kokugogaku* 48.
Ohno, Susumu. 1977. On'in no hensen. *Iwanami kôza Nihongo 5, On'in*: 147-220. Tôkyô: Iwanami Shoten.
Serafim, Leon. 1999. Reflexes of Proto-Korea-Japonic Mid Vowels in Japonic and Korean. Paper presented at the Workshop on Korean-Japanese Comparative Linguistics, XIVth International Conference on Historical Linguistics, Vancouver, British Columbia.
Thorpe, Maner L. 1983. *Ryûkyûan Language History*. University of Southern California Ph.D. dissertation.
Unger, J. Marshall. 1977/1993. *Studies in early Japanese morphophonemics*. Yale University dissertation, reproduced by IULC.
Vovin, Alexander. 2000. On the great vowel shift in Middle Korean and position of stress in proto-Korean. *Korean Linguistics* 10, 61-79
Wenck, Günther. *Japanische Phonetik*, Band IV: Erscheinungen und Probleme des japanischen Lautwandels. Wiesbaden: Otto Harrassowitz.
Whitman, John. 1985. *The Phonological Basis for the Comparison of Japanese and Korean*, Harvard University dissertation.
Yoshitake, Saburô. 1928. The history of the Japanese particle *i*. *Bulletin of the School of Oriental Studies* 5: 889-896.