AN INTERPRETATION OF THE VOWEL SYSTEMS OF OLD CHINESE AND OF WRITTEN BURMESE

by E. G. PULLEYBLANK

WORKS CITED

ALLEN 1956: W. S. Allen, "Structure and system in the Abaza verbal complex", *Transactions of the Philological Society* (1956) pp. 127–176.
BENEDICT 1948: Paul Benedict, "Archaic Chinese *g and *d", *Harvard Journal of Asiatic Studies* 11 (1948) pp. 197–206.
CHAVANNES 1903: E. Chavannes, *Documents sur les T'ou-kiue occidentaux*, St. Petersburg.
CHAVANNES 1906: E. Chavannes, "Trois généraux chinois de la dynastie des Han orientaux", *T'oung Pao* 7 (1906) pp. 210–260.
GHIRSHMAN 1946: R. Ghirshman, *Bégram*, Cairo.
HALLIDAY 1959: M. A. K. Halliday, *The Language of the Chinese Secret History of the Mongols*, Oxford.
HARTMANN 1944: L. M. Hartmann, "The segmental phonemes of the Peiping dialect", *Language* 20 (1944) pp. 28–42.
HOCKETT 1947: Charles F. Hockett, "Peiping phonology", *Journal of the American Oriental Society* 67 (1947) pp. 253–267.
JUDSON 1826: A. Judson, *A dictionary of the Burman language*, Calcutta.
JUDSON 1849: A. Judson, *A dictionary of English and Burmese*, Maulmain.
JUDSON 1893: A. Judson, *Judson's Burmese–English Dictionary*. Revised and enlarged by Robert C. Stevenson, Rangoon.
KARLGREN 1934: B. Karlgren, "Word families in Chinese", *Bulletin of the Museum of Far Eastern Antiquities* 5 (1934) pp. 9–120.
KARLGREN 1957: B. Karlgren, "Grammata Serica recensa", *Bulletin of the Museum of Far Eastern Antiquities* 29 (1957) pp. 1–332.
KUIPERS 1960: Aert H. Kuipers, "*Phoneme and morpheme in Kabardian*", Janua Linguarum no. 7.
LEHMANN 1955: Winfred P. Lehmann, *Proto-Indo-European phonology*, Austin, Texas.
LO and CHOU 1958: Lo Ch'ang-p'ei 羅常培 and Chou Tsu-mo 周祖謨 *Han Wei Chin Nan-pei ch'ao yün-pu yen-pien yen-chiu* 漢魏晉南北朝韻部演變研究 vol. 1.
Lo-yang ch'ieh-lan chi chiao chu 洛陽伽藍記校註, edited by Fan Hsiang-yung 范祥雍, Shanghai 1958.
MILLER 1956: Roy Andrew Miller, "The Tibeto-Burman Ablaut system", *Transactions of the International Conference of Orientalists in Japan* 1 (1956) pp. 29–56.
MILLER 1957: Roy Andrew Miller, "The phonology of the Old Burmese vowel system as seen in the Myazedi inscription", *Transactions of the International Conference of Orientalists in Japan* 2 (1957) pp. 39–43.
NISHIDA 1955–56: Nishida Tatsuo 西田龍雄, "Myazedi hibun ni okeru chūko biruma-go no kenkyū", *Kodaigaku* (Palaeologia) 4 (1955), pp. 17–32 and 5 (1956) pp. 22–40.
PELLIOT 1934: Paul Pelliot, "Tokharien et koutchéen", *Journal asiatique* 224 (1934) pp. 23–106.
PULLEYBLANK 1960: E. G. Pulleyblank, "Studies in early Chinese grammar, part I", *Asia Major* 8 (1960) pp. 36–67.

PULLEYBLANK 1962: E. G. Pulleyblank, "The consonantal system of Old Chinese", *Asia Major* 9 (1962) pp. 58–144, 206–265.
RYGALOFF 1955: A. Rygaloff, "La phonologie du pékinois", *T'oung Pao* 43 (1955) pp. 183–264.
SHAFER 1940: Robert Shafer, "The vocalism of Sino-Tibetan", *Journal of the American Oriental Society* 60 (1940) pp. 302–337.
SHAFER 1941: Robert Shafer, "The vocalism of Sino-Tibetan, part 2: consonantal finals", *Journal of the American Oriental Society* 61 (1941) pp. 18–31.
SHAFER 1943: Robert Shafer, "Further analysis of the Pyu inscriptions", *Harvard Journal of Asiatic Studies* 7 (1942–43) pp. 313–366.
Shui-ching chu 水經注 40 ch., by Li Tao-yüan 酈道元 (d. A.D. 527), edition of Wang Hsien-ch'ien 王先謙 reprinted in Ssu-pu pei yao (single volume edition, n.d.)
SPRIGG 1961: R. K. Sprigg, "Vowel harmony in Lhasa Tibetan", *Bulletin of the School of Oriental and African Studies* 24 (1961) pp. 116–138.
STEWART 1945: J. A. Stewart, *Manual of colloquial Burmese*, London.
STIMSON 1961: Hugh M. Stimson, review of *Studia Serica Bernhard Karlgren dedicata* in *Language* 37 (1961) pp. 180–86.
WANG 1958: Wang Li 王力, *Han yü shih kao* 漢語史稿 3 vols., Peking.
YAKHONTOV 1959: S. E. Yakhontov, "Fonetika kitaiskogo yazyka i tysyacheletiya do n. e. (sistema finalei)", *Problemy vostokovedeniya* 2 (1959) pp. 137–147.
YAKHONTOV 1960: S. E. Yakhontov, "Fonetika kitaiskogo yazyka i tysyacheletiya do n. e.", *Problemy vostokovedeniya*, 6 (1960) pp. 102–115.

In my discussion of the phonology of Old Chinese in *Asia Major* IX (1962) pp. 58–114, 206–265, I was principally concerned with the initial and final consonants but had necessarily to consider the vowel system as well, and I outlined tentative proposals about this. Since then, while adhering to approximately the same phonetic values of the vowels for the Han period, I have come to a different interpretation of the phonemic structure. Many points of detail remain to be worked out but I should like at this stage to give the theory in outline and also to show how a similar analysis can be applied to Written Burmese. One can, I believe, in this way lay a sounder basis than hitherto for Sino-Tibetan comparative studies and I hope that my old teacher, Walter Simon, who has done so much as a pioneer in this field, will find it an acceptable tribute in honour of his seventieth birthday.

The phonetic values of the rhyme vowels

The rhyme categories of the *Shih-ching* as established by the Chinese philologists of the Ch'ing period and their modern successors indicate only two rhymes before labial finals, three before dentals and six before velars and laryngals (of which only five occur before -ŋ). Karlgren and the majority of those who have come after him have felt it necessary to construct for many of these rhyme classes not a single vowel but a congeries of supposedly similar vowels. In Karlgren's system there are also cases in which the *same* vowel overlaps more than one rhyme category. Only Wang Li (1957) has insisted on a single and distinct head vowel (or diphthong) for each rhyme category (with however the possibility of distinctions of length). This is clearly a more satisfactory solution if it can be achieved. The values which

Wang Li gives for his head vowels are also, in my view, very judicious, eliminating a number of errors in Karlgren's Archaic system; but he could only achieve this simplification to a one vowel per rhyme-class system by proposing combinations of long and short semivowels, together with frequent resort to the idea of "irregular development", which made a highly unconvincing system. The hypotheses advanced in my previous article concerning the effects on Middle Chinese vocalism of the loss of medial **-l-** (=Sino-Tibetan **-r-**), **-δ-** (=Sino-Tibetan **-l-**) and **-e̯-** (=Sino-Tibetan **-y-**), and for the reconstruction of final consonants where Wang Li has open syllables, largely removed the need for such expedients and enabled me to account for the principal developments within each rhyme category without the need to postulate any original distinctions of head vowel quality within them.

I still found it necessary to postulate long and short head vowels rhyming freely with each other in order to account for the *yod* of Division III rhymes. As will be explained below, I now think that, at least in certain circumstances (namely, where there was originally a medial **-y-** or **-r-**), it is possible to explain this in another way. It is not yet clear whether one will ultimately be able to extend this principle and to dispense with any vocalic distinction, whether of quantity or quality, within each rhyme class.

The following is a table of the established rhyme categories of the *Shih-ching*. The names of the rhymes (given with their Middle Chinese readings) are those used by Lo Ch'ang-p'ei and Chou Tsu-mo 1958, p. 11 but the arrangement is different. The numbers of the corresponding rhyme classes in Karlgren's system are given in parentheses.

	yin	*yang*	*ju*
I	(a) 之 **cɨə** (K. XXI)	(b) 蒸 **cɨəŋ** (K. XX)	(c) 職 **cɨək** (K. XXI)
II	(a) 支 **cɨe** (K. XIX)	(b) 耕 **kaəŋ** (K. XVIII)	(c) 錫 **sek** (K. XIX)
III	(a) 魚 **ŋɨo** (K. II, XVII)	(b) 陽 **yaŋ** (K. XVI)	(c) 鐸 **ḍak** (K. XVII)
IV	(a) 侯 **ĥu** (K. III, XXVI)	(b) 東 **tuŋ** (K. XXV)	(c) 屋 **·uk** (K. XXVI)
V	(a) 幽 **·yiu** (K. XXIII)	(b) 冬 **toŋ** (K. XXII)	(c) 沃 **·ok** (K. XXIII)
VI	(a) 宵 **sɨeu** (K. XXIV)		(c) 藥 **yak** (K. XXIV)
VII	(a) 微 **mɨəi** (K. XI)	(b) 諄 **cɨwin** (K. IX)	(c) 術 **źɨwit** (K. X)
VIII	(a) 脂 **cɨi** (K. XI)	(b) 眞 **cɨin** (K. VII)	(c) 質 **cɨit** (K. VIII)
IX	(a) 哥 **ka** (K. II, VI) (d) 祭 **tshai**ˋ (K. V)	(b) 元 **ŋɨwan** (K. IV)	(c) 月 **ŋɨwat** (K. V)
X		(b) 談 **tham** (K. XII)	(c) 盍 **ĥap** (K. XIII)
XI		(b) 侵 **tshɨim** (K. XIV)	(c) 緝 **tshɨip** (K. XV)

The rhymes are classified according to their Middle Chinese reflexes as *yin* (vocalic endings), *yang* (nasal endings) and *ju* (stop consonant endings). In general, although only level tone rhymes are given, *yin* and *yang* rhymes exist (with certain blanks) in all three tones—level, rising and departing. Class IX (d) is exceptional in that it occurs only in the departing tone. Hereafter I shall distinguish between "rhyme classes", e.g. Class I (a), and "rhyme groups", that is those rhymes which are shown by cross rhyming and *hsieh-sheng* contacts to have had the same vowel and finals of the same kind (velar-laryngal, dental or labial), e.g. Group I.

The next table gives the principal Middle Chinese reflexes of the various *Shih-ching* rhyme classes arranged according to the rhyme tables.

		Grade I	II	III/IV	IV
I	(a)	**-əi**	**-aəi**	**-ɨə**	
		-wəi, -u	**-waəi**	**-ɨwi, -ɨu**	
	(b)	**-əŋ**	**-aəŋ**	**-ɨəŋ**	
		-wəŋ, -uŋ	**-waəŋ**	**-ɨuŋ**	
	(c)	**-ək**	**-aək**	**-ɨək**	
		-wək	**-waək**	**-ɨwək, -ɨuk**	
II	(a)		**-ae**	**-ɨe, -ye**	**-ei**
			-wae	**-ɨwe, -ywe**	**-wei**
	(b)		**-aəŋ**	**-ɨeŋ, -ɨaŋ, -yeŋ**	**-eŋ**
			-waəŋ	**-ɨwaŋ, -yweŋ**	**-weŋ**
	(c)		**-aək**	**-ɨek, -ɨak, -yek**	**-ek**
			-waək	**-ɨwek, -ywek**	**-wek**
III	(a)	**-ou**	**-a**	**-ɨo, ɨa**	**-ei** (rare)
			-wa	**-ɨou**	
	(b)	**-aŋ**	**-aŋ**	**-ɨaŋ, -ɨaŋ**	
		-waŋ	**-waŋ**	**-ɨwaŋ, -ɨwaŋ**	
	(c)	**-ak**	**-wak**	**-ɨak, -ɨak, -ɨek,**	**-ek** (rare)
		-wak	**-wak**	**-ɨwak, -ɨwak**	
IV	(a)	**-u**		**-ɨou**	
	(b)	**-uŋ**	**-auŋ**	**-ɨoŋ**	
	(c)	**-uk**	**-auk**	**-ɨok**	
V	(a)	**-au**	**-au**	**-ɨu, -yiu**	**-eu**
	(b)	**-oŋ**	**-auŋ**	**-ɨuŋ**	
	(c)	**-ok**	**-auk**	**-ɨuk**	**-ek**
VI	(a)	**-au**	**-au**	**-ɨeu, -yeu**	**-eu**
	(c)	**-ak, -ok, -uk**	**-auk**	**-ɨak**	**-ek**

		Grade I	II	III/IV	IV
VII	(a)	-əi	-aəi	-i̯əi, -i̯i	-ei
		-wəi	-waəi	-i̯wəi, -i̯wi	
	(b)	-ən	-aən	-i̯ən, -i̯in	-en
		-wən	-waən	-i̯wən, -i̯win	
	(c)	-ət	-aət	-i̯ət, -i̯it	
		-wət	-waət	-i̯wət, -i̯wit	
VIII	(a)		-aəi	-i̯i, -yi	-ei
			-waəi	-i̯wi, -ywi	-wei
	(b)		-aən	-i̯in, -yin	-en
			-waən	-i̯win, -ywin	-wen
	(c)		-aət	-i̯it, -yit	-et
			-waət	-i̯wit, -ywit	-wet
IX	(a)	-*a*	-a	-i̯e, -i̯a, -i̯*a*	
		-w*a*	-wa	-i̯we, (-i̯w*a*)	
	(b)	-*a*n	-an, -aən	-i̯en, -yen	-en
		-w*a*n	-wan, -waən	-i̯wen, -ywen	-wen
	(c)	-*a*t	-at, -aət	-i̯et, -yet	-et
		-w*a*t	-wat, -waət	-i̯wet, -ywet	-wet
	(d)	-*a*i˄	-ai˄, -aəi˄	-i̯ei˄, -yei˄	-ei˄
		-w*a*i˄	-wai˄, -waəi˄	-i̯wei˄, -ywei˄	-wei˄
X	(b)	-əm	-aəm	-i̯im, -yim	-em
	(c)	-əp	-aəp	-i̯ip, -yip	-ep
XI	(a)	-*a*m (-əm)	-am, -aəm	-i̯*a*m, -i̯am, -i̯em	-em
	(b)	-*a*p (-əp)	-ap, -aəp	-i̯*a*p, -i̯ap, -i̯ep	-ep

In many cases the Middle Chinese vocalism corresponding to each group of rhymes is consistent and immediately suggests probable values for the Old Chinese vowels. Thus Karlgren and Wang Li agree in assigning **ə** vocalism to Groups I, VII and X and **e** vocalism to Groups II and VIII (but Karlgren does not recognize a distinction between Classes VII (a) and VIII (a)). Both scholars likewise assign **a** vocalism to III (b), (c), IX (a), (b), (c), (d) and XI (b), (c). Wang extends this also to the whole of Class III (a) which Karlgren divides into two classes: **-o** and **-âg** (see *Asia Major* 1962 p. 210). Karlgren postulates both back **â** [*a*] and front **a** [**a**] throughout. Wang postulates back ***a*** in Group III and front **a** elsewhere. The reconstruction of a final dental consonant **-δ** in IX (a) makes this distinction unnecessary.

The phonetic values of the unrounded vowels—**ə, e, *a***—may thus be regarded as fairly well established. On theoretical grounds I formerly proposed to derive **ə** from an earlier close front **i**, but the value in Han

dynasty transcriptions agrees better with a mid to high central vowel. I now think that such a value should be reconstructed for the earlier stages of Old Chinese and indeed for common Sino-Tibetan.

Greater difficulty arises over the rounded vowels which occur only before velar and laryngal finals in Groups IV, V and VI. Here the values reconstructed by Karlgren and Wang Li do not agree. Karlgren reconstructs for the three groups pure vowels—**u, ô** [**o**], and **o** [ɔ]—in decreasing order of closeness. Wang Li reconstructs a pure vowel **o** only in Group IV. In V and VI he reconstructs diphthongs **əu** and **au**. I previously adopted Wang Li's values for IV and VI but reconstructed a pure vowel **u** in V. In terms of phonetic values as shown in transcriptions there is little to choose between **u** and **əu** but for other reasons I now think that Wang Li's value is to be preferred. The reasons for this will appear below but first it is necessary to show why the relative positions of the vowels in IV, V and VI must be considered to agree with Wang's values rather than Karlgren's.

When we look at the Middle Chinese reflexes of Classes IV (b), (c) and V (b), (c), we find a curious crossing over as between Division I and Division III rhymes. That is, Middle Chinese rhymes **-uŋ, -uk** are derived from IV but, **-i̯uŋ, -i̯uk** are derived from V. Conversely **-oŋ, ok** are derived from V and **-i̯oŋ, -i̯ok** are derived from IV. Karlgren supposed that the Division I rhymes had been more stable than the Division III rhymes and adopted them as the basis for his Archaic reconstruction. In this he was certainly mistaken. There is abundant evidence that the Old Chinese vocalism in Group IV was more open than in Group V. It may be summarized as follows:

(1) In poetic rhymes of the Han period Classes IV (a) and III (a) (**-a̱ĥ**) form a single class. Cross rhymes between IV (b) and III (b) are also common.

(2) *Hsieh-sheng* connections show an intimate relationship between Group IV and the *ho-k'ou* rhymes of Group IX (**-waδ, -wan,** etc.). Though the evidence is less abundant, there are a few cases pointing to a similar relationship between Groups V and VII. (On these two points see further below.)

(3) Early transcriptions involving characters from Groups IV and V point to a more open value, something like [**o**] or [ɔ], for Group IV, and a closer value, something like [**u**], for Group V. Examples which clearly illustrate this (whatever further problems some of them may present) may be found in *Asia Major* 1962, pp. 88, 90, 101, 109, 115, 117, 125, 213, 214, 221, 223, 240, 246.

As far as the relative placing of the phonetic values is concerned, Karlgren's open **o** [ɔ] for Group VI is not very different from ***aw***. A diphthongal interpretation is to be preferred however on a number of grounds. In the first place it makes it easy to account for the development of the

Middle Chinese reflexes of Class VI (a), all of which show **-u** diphthongs. Before final **-k** the semivowel **-w-** disappears except in Division II, sometimes causing a rounding of the head vowel but as often not. It may be noted further that if we postulated a pure vowel [ɔ], we should expect this Group, not Group IV, to be closest to Group III (**-aĥ**) in terms of rhyming, but this was not the case. Transcriptions with characters from Group VI are not very common but such as there are agree well with the interpretation suggested. Indeed those from Class VI (a) would even support the reconstruction of **-av** or **-aβ**, that is with a fricative consonant rather than a semivowel **-w-**. Thus we have: 高 M. **kau-** as the first syllable in Kabul (*Asia Major* 1962, p. 223); 澡 M. **tsau˄** as the second syllable of Waxšab (p. 222); and 挑 M. **deu** in one of the transcriptions of the Prakrit form behind Sanskrit Puśkalāvati, Greek *Πευκελαῶτις*, modern Peshawar (p. 101). We also find 膏 M. **kau** for the second syllable of Vima kadphises (cf. the Prakritic spelling Uvima kav[thisa], Ghirshman 1946, p. 106).

Examples of ***-awk** are even rarer but we do find one such case in the transcription of a presumably Tocharian word to which Pelliot (1934) once devoted a large part of a long article. It appears on the one hand as the name of a monastery at Kucha and on the other hand as the name of a stupa erected by Kanishka at Peshawar. The name of the stupa is given by Sung Yün as 雀離 M. **tịak-lịe** (*Lo-yang ch'ieh-lan chi chiao-chu* 5, p. 327) and the same form occurs in *Shui-ching chu* 2, p. 63A, quoting the anonymous *Shih-shih hsi-yü chi*. In the life of Kumarajiva the monastery is called 雀梨 M. **tsịak-lịi**. Pelliot also noted that the Chüeh-li 爵離 M. **tsịak-lịe** Pass, mentioned in connection with Pan Yung's expedition against Karashahr of A.D. 127 (Chavannes 1906 p. 254), must contain the same word. In all these cases M. **tsịak** should go back to earlier **-awk**. Confirmation of this is provided by a new transcription in three characters given by Hsüan-tsang for the name of the monastery: 照怙釐 M. **cịeu-ĥou˄-lịə**, which evidently points to something like ***cauɣri**. For this we should expect to find ***caukri** in Tocharian spelling. Pelliot also wished to find still later forms of the same name in 柘厥 M. **cịek-kịwat** (or 拓 M. **cịa˄-**), the name of a monastery near Kucha mentioned by Wu-k'ung (ca. 788) and the 柘厥 Pass west of Kucha in Chia Tan's itinerary of about the same date (Chavannes 1903, p. 8); but we should evidently have to suppose a linguistic evolution in Tocharian after the time of Hsüan-tsang to account for the different treatment of the first syllable. Pelliot proposed very tentatively to connect the word with an unknown word *käkür* found in a Uyghur Turkish Buddhist text, apparently meaning the finial of a stupa, and to suppose that the original meaning of the Tocharian word was "tower". The passage in the *Shui-ching chu* however gives the name of the monastery in full as Chüeh-li ta ch'ing-ching 大清淨 "Chüeh-li Great Pure". If the words "Great Pure" in Chinese are related in meaning to the Tocharian name, the latter

may mean something like "bright" and may be a derivative of the root found in Tocharian B. *cauk-*, A. *cok* "lamp".

If we interpret Group VI as **-aw-**, it becomes very attractive to follow Wang Li with regard to Group V also. We can thus easily account for the falling together of the Division I rhymes of V and VI: **-əwĥ> -au**. The lowering of **ə** to **a** is parallel to that which later caused the falling together of **-əm** and **-am**, **-əp** and **-ap** (also **-əi** and **-ai**). Before **-ŋ** and **-k** we evidently have a similar lowering which did not proceed so far, giving **-oŋ, -ok**. The Division II and "pure" Division IV rhymes of Groups V and VI also fell together, giving **-au, auŋ, -auk, -eu, -ek.**

The phonemic interpretation of the Old Chinese Vowel System

The system of rhyme vowels as now established for the *Shih-ching* groups is as follows:

(a) before velar and laryngal finals:

	ə	**əw**
e	**o**	
	a	**aw**

(b) before dental finals:

	ə
e	
	a

(c) before labial finals:

ə
a

To account for the unevenness of distribution as between different classes of final consonants I formerly supposed that the *Shih-ching* system had developed out of an earlier system in which there had been a five-vowel pattern:

i		**u**
	e **o**	
	a	

I supposed (1) that **i** had become centralized to **ə**, (2) that **u** and **o** had broken to **wə, wa** before dental finals, (3) that before labial finals **u** and **o** had become unrounded by dissimilation, falling together with **ə** and **a**. The fate of original **e** before labials was not clear.

After publishing this scheme in outline I learned that S. Yakhontov (1960) had already made a similar proposal about **o** and **u** before dental finals. It was encouraging to find that another scholar had used essentially the same evidence to reach the same conclusion. Nevertheless I now think

that we were both wrong and that the correct answer lies in precisely the opposite direction, that is, that the two vowel ə/a system indicated by the rhymes with labial finals is primitive.

By adopting Wang Li's analysis of Groups V and VI we have already gone part of the way towards such a solution, since **əw**, ***a*w** are precisely parallel to **əm**, ***a*m**. It remains to analyse **o** and **e**.

As far as **o** is concerned, we can retain the principal insight that correlated **w*a*** before dental finals with **o** before back finals. The first clue to this is given by the complementary distribution of Group IV and the *ho-k'ou* rhymes of Group IX after initials other than labials, velars and laryngals. That is, we have syllables reflecting ***twan**, ***tswa*δ** and ***toŋ**, ***tsoĥ**, but not ***twaŋ**, ***tswak**.

The same complementarity is further shown by cases of *hsieh-sheng* correspondence such as the following:

豆 M. **du**ˋ: 短 M. **twan**ˊ
重 M. **ḍioŋ**: 疃 M. **thwan**ˊ
儿 M. **jɨou**: 朵 M. **twa**ˊ
儒 M. **ńɨou**: 耎 M. **ńɨwen**ˊ
取 M. **tshɨou**ˊ: 最 M. **dzwan**, 最 M. **tswai**ˋ
从 M. **dzɨoŋ**: 坐 M. **dzwa**ˊ

The same correspondence with velar initials is shown in:

寇 M. **khu**ˋ: 完 M. **ĥwan**

From this evidence I formerly concluded, as did Yakhontov, that original **o** before dental finals had broken to **w*a***. One can however argue at least equally well in the opposite direction and suppose that original **w*a*** was rounded to **(w)o** under the influence of the back finals. On the former assumption one would have eliminated the semivowel **w** as an independent phoneme in prevocalic position from Old Chinese (syllables like **kwaŋ** being explained by supposing a separate category of labialized velar and laryngal initial consonants). As we have seen, however, there is good reason to retain **w** *after* the head vowel. By analogy one might expect it to have also occurred *before* the head vowel. The hypothesis of labialized velar and laryngal initials can be retained, at least provisionally, to explain the difference between M. **kwaŋ** < ***k*ʷ*aŋ** and M. **kuŋ** < ***koŋ** < ***kwaŋ**.

If **o** of Group IV comes from **w*a***, it is possible to explain without difficulty why Class IV (a) (**-oĥ**) and Class III (a) (**-*a*ĥ**) are distinct in the *Shih-ching* but form a single rhyme category in the Han dynasty. If it were a case of two originally separate rhymes falling together, it would be difficult to understand how the Middle Chinese reflexes could have been kept, on the whole, distinct. On the other hand, if the development was **w*a*** > **(w)o** before back finals, we can understand how in one dialect, that of the *Shih-ching*, this could have already been completed in front of **ĥ** as well as **-ŋ**

and **-k**, while other dialects, in particular the one which was dominant in Han, were more conservative. It is along these lines that one can, I think, explain the fact demonstrated by Yakhontov that in the Odes words of type **-w*a*n**, **-w*a*t**, **-w*a*δ** tend to rhyme separately from words in **-*a*n**, **-*a*t**, **-*a*δ**. He showed that words with central initials (those giving Middle Chinese **t-**, **ts**, **c-**, **tṣ-**, **l-**, etc.) can be divided quite sharply into *ho-k'ou* and *k'ai-k'ou* rhymes (except for one or two words like 泉 M. **dzɨwen** which *always* rhyme as *k'ai-k'ou*: note that this character is frequently borrowed to write 鎒 M. **dzɨen**). Further (allowing for some exceptions) words with labial initials and *ho-k'ou* words with back initials can be divided into those which rhyme in **-ạn** and those that rhyme in **-wan**. If one assumes that the *Shih-ching* dialect is the direct ancestor of later standard Chinese, one is forced to take this as evidence that there was originally a separate rhyme **-on** which changed to **-wan**. On the other hand, one can, I suggest, take this as a further example of the aberrant *Shih-ching* dialect, which tended to round **w*a*** to **(w)o** more extensively than later standard Chinese. I have noted elsewhere (1960) other evidence that the *Shih-ching* shows dialect features not continued in standard Chinese of later times. It is worth noting that the rounding of **wa** to **o** (and also of **wə** to **u**), like the change of **-ŋ** > **-n** and **-k** > **-t** after front vowels, also found in the *Shih-ching* dialect, is a characteristic of modern Hakka. It remains to be seen whether this is a clue as to the origins of the Hakka, who according to some traditions are said to have begun their long migrations from somewhere in Ho-nan.

The supposition that **o** developed from **w*a*** rather than the other way around would help to account for certain cases in which there appear to be *hsieh-sheng* connections between Groups III and IV, even if we cannot yet explain them in detail:

股, 羖 M. **kou**ˊ: 殳 M. **jɨou**
鼓 M. **kou**ˊ: 壴 M. **ṭɨou**ˊ
雨 M. **ĥɨou**ˊ: 羸 M. **lu**ˋ (Note that Benedict 1948, p. 204, reconstructs ***r-wa*** as the Tibeto-Burman word for "rain".)

In terms of distribution the situation in Group VIII is in some ways similar to that in Group IX. That is, we have words with central initials in both *ho-k'ou* and *k'ai-k'ou* (though comparatively few of the latter), in contrast to Group I (**-əĥ**, **-əŋ**, **-ək**) which has no *ho-k'ou* rhymes except with back initials. There are also a few cases of *hsieh-sheng* connections, the explanation of which I shall defer for the present, between Groups VIII and V, thus:

媼 M. **ʻau**: 溫 M. **ʻwən**
孰 M. **jɨuk** (cf. 誰 M. **jɨwi** "who"): 敦 M. **twən**, **jɨwin**
蜼 M. **yu**ˋ, as well as **ywi**ˋ, **lɨwi**ˋ: 隹 M. **cɨwi** (note also 鳽 M. **yeu**, Group VI!)

The evidence adduced by Yakhontov for separate **-un**, **-ut**, **-uδ** rhymes is much less clear-cut than in the case of **-on**, **-ot**, **-oδ**, but as far as it goes it can, I think, be explained by a similar dialectal peculiarity of the *Shih-ching* language. In the Han dynasty not only is there no such distinction discernible within Group VIII, but Groups VII (**eδ**, **en**, **et**) and VIII fall together.

If we are right in analysing the vocalism of Group V as **əw**, there is in any case not the same relation between Groups I and V as between III and IV. It seems likely that **wə** would have existed originally before back finals as well as before dental finals, but if so, no such distinct category seems to be reflected either in Old Chinese rhymes or in their Middle Chinese reflexes. It seems likely that under some conditions **wə** fell together with **wa** while in other cases the labial element was lost—if, for example, there is really a *hsieh-sheng* connection, as indicated by the *Shuo-wen*, between 曾 M. **tsəŋ** and 悤 M. **tsuŋ**, or, as appears from the graph, between 倂 M. **yəŋˋ** and 幷 M. **kịoŋ**. This might also explain 而 M. **ńịə**: 儒 M. **ńịou**, 耎 M. **ńịwenˊ**, etc.; and 耳 M. **ńịəˊ**; 取 M. **tshịouˊ**, etc.

If the vowel **o** can thus be resolved phonemically into **wa**, it becomes probable that the corresponding unrounded vowel **e** can similarly be resolved into **y**+**a** or **y**+**ə**. The Middle Chinese "pure" Division IV rhymes: **-eŋ**, **-ek**, **-ei**, **-en**, **-et**, **-ew**, **-em**, **-ep**—go back partly to separate rhyme categories in the Odes, namely Group II, with velar and laryngal finals, and Group VIII with dental finals, but they are also derived in part from all the other *Shih-ching* rhyme groups except Groups I and IV (examples from Group III are rare). It was to account for this that Karlgren (for whom Middle Chinese **e** is **ie**) reconstructed "vocalic **i**" as an accompaniment of the main vowel in these groups, thus: **-iôg** > **-ieu**, **-ian** > **-ien**, etc. Apart from the objections that have been raised by many scholars to Karlgren's "vocalic **i**" in Middle Chinese (notably the evidence of Buddhist transcriptions in which M. **e** regularly represents *e* with no trace of preceding **i** or **y**) this solution fails to take account of the fact that there are also special yodized Division IV rhymes in each rhyme class associated with the "pure" **e** rhymes, namely, **-yen**, **-yiu**, etc.

The solution which I adopted in my previous article was to postulate a semivowel **-e̯-**, regarded, to begin with, as a kind of algebraic symbol without a definite commitment as to its phonetic value, having different effects on following short and long vowels respectively: **e̯**+following short vowel gave **e**, **e̯**+following long vowel gave the Division IV rhymes. It later became apparent that one could equate this **e̯**, at least in some cases with Sino-Tibetan **y** and that it could be regarded as a medial consonant, comparable to **-l-** (Sino-Tibetan **-r-**) and **-δ-** (Sino-Tibetan **-l-**), having similarly various effects on the development of Chinese vocalism.

We may now go a step further and analyse the head vowel **e** of rhyme Groups II and VIII as likewise composed of **y** + **ə** or ***a***. In the case of Group VIII the choice between these alternatives is easy. **y**+***a*** words form a special category within Group IX. No such category is discernible within Group VII and we may therefore regard Group VIII as filling this gap. (There are a few words in **-en** from Group VII with initials **s**, **t-**, **d-**, but at the same time, there are no words in **-ən** with these initials.) Confirmation of the close relationship between Groups VII and VIII is provided by the fact that in the Han period they form a single rhyme category, a situation parallel to that of Groups III and IV.

The choice is not so obvious in the case of Group II. The few cases of M. **-ek** coming from III (c) are hardly sufficient to justify one in supposing a separate **y**+***a*** category within this group and I now doubt whether, as I once thought, rhyme **-a**, **-ịa** can be partly explained in this way. In terms of *hsieh-sheng* relationships Group II shows connections with both Group I and Group III, occupying in this way a position comparable to Group IV (i.e. **o**=**wa**, sometimes from **wə**). Symmetry would therefore lead us to analyse **e** of Group II as **y**+**a** as far as the *Shih-ching* system is concerned. This is confirmed by the Middle Chinese reflexes of this group which correspond to those of **y**+**a**, rather than **y**+**ə**. Thus Group II gives **-ei**, **-ye**; **-eŋ**, **-yeŋ**; **-ek**, **-yek**, like **-eu**, **yeu** from VI (a) and **-en**, **-yen** from Group IX and in contrast to **-eu**, **-yiu** from V (a), **-en**, **-yin**, etc., from Group VIII.

Up till now I have assumed that **y** always preceded the main vowel. This assumption not only means however a contrast with the behaviour of **w**, which we suppose to have appeared either before or after the main vowel, but is in marked contrast to the situation we find in modern Chinese dialects and in, for example, Burmese. It would seem more natural to find that **y**, as well as **w**, could appear in either position.

It moreover seems evident that it is much easier to account phonetically for the pure **e** rhymes of Middle Chinese as developing out of **-əy-**, ***-ay-***, rather than out of **-yə-**, ***ya-***. One has only to suppose that **y** became vocalized and the head vowels umlauted to [**e**]. The resulting diphthong [**ei**] may have tended to be pronounced as a monophthong [**e**] but even this need not necessarily be assumed on the basis of the transcription evidence. A diphthong [**ei**] might well have served to represent foreign [**e**], (just as in English pronunciation French [*e*] becomes [*ei*]), even if Indic *e*, originally a diphthong *ai*, was pronounced as a pure vowel at this period. If we suppose that **-ei-** remained a diphthong, we can treat as a simple metathesis the change to **-ie-** that occurred during the T'ang period, (resulting ultimately in the palatalization of preceding velar initials, so that, for example, 見 M. **kenˋ**, i.e. **keinˋ**, becomes *chien* in Modern Pekingese).

The corresponding Middle Chinese Division IV **-y-** rhymes, and also the palatalization of velar initials associated with the effect of **-y-**, can now be explained directly as the result of Old Chinese **-yə-**, **-y*a*-**, without any such complicated hypothesis as I was previously forced to advance, involving a different effect of **-y-** on short and long vowels. Thus the two readings of 鳩 M. **keu**, **cịeu**, formerly interpreted as ***ky*a*uĥ** > **keu**, ***kyāuĥ*** > **kēu** > **kyeu** > **cịeu**, can be simply accounted for as: ***k*a*ywĥ*** > **keiu** (=**keu**), ***ky*a*wĥ*** > **cịeu**.

The chief objection that I can see to this solution is that it means that **-əy-/-yə-**, **-*a*y-/-y*a*-** must have been allowed to rhyme freely together in all rhyme groups and that, except before back finals, they could also rhyme with **-ə-** and **-*a*-** respectively. This is perhaps less surprising if we regard **-y-** as consonantal rather than vocalic, since we know that there was a certain liberty in rhyming together, for example, **-t** and **-ts**, **-k** and **-ks**.

There is in fact a certain tendency discernible in the Odes, especially in Groups V and IX, for **-əy-/-yə-** and **-*a*y-/-y*a*-** words to rhyme as separate sub-groups within their rhyme classes. This is probably a result of difference in timbre of the head vowels rather than a distinction between **-ywĥ** and **-wĥ**, **-yn** and **-n**. Compare the development of Groups II (**-*a*yĥ/-y*a*ĥ**, **-*a*yŋ/-y*a*ŋ**, **-*a*yk/-y*a*k**) and VIII (**-əyð/yəð**, **-əyn/-yən**, **-əyt/-yət**) as separate rhyme Groups.

A similar argument can be applied to the loss of medial **-l-** (Sino-Tibetan **-r-**) resulting in Division II vocalism. Though the connection between this vocalism and the loss of **-l-** is very clear, the phonetic explanation of a direct development of ***kl*a*n** > **kan**, etc., is by no means obvious. On the other hand if we suppose that the order was ***k*a*ln** (***k*a*rn**) we can suppose that **-l-** (**-r-**) was vocalized to **-ï-**, giving **k*a*ïn**. This would have brought about an umlaut of the head vowel, but not so far as that caused by **-y-**: ***k*a*ïn** > ***k*ɛïn**, perhaps sometimes tending to a monophthongal pronunciation [**kɛn**], i.e. **kan**. At the same time ***kl*a*n** (***kr*a*n**) would have developed to **kïɛn**. In the Ch'ieh-yün such words are treated as rhyming with M. **kyen**, implying a further heightening of the main vowel, and I therefore write M. **kịen** but, as noted in my previous article, there is reason to think that in other dialects a pronunciation **kịan** [**kïɛn**] was preserved, parallel to the rhyme **kịaŋ** [**kïɛŋ**].

The subsequent palatalization of Division II rhymes, so that 閒 M. **kan** gives Pekingese *chien*, can be explained in exactly the same way as that of the **e** rhymes, i.e. by a metathesis: **kɛïn** > **kïɛn** > **kien**.

Similarly when the head vowel was originally **ə**: ***kəln** (***kərn**) > **kəïn** (=M. **kaən**), ***kəlm** (***kərm**) > **kəïm** (=M. **kaəm**), ***kəlŋ** (***kərŋ**) > **kəïŋ** (M. **kaəŋ**) etc. The distinction between these rhymes and **k*a*ïn**, **k*a*ïm**, **k*a*ïŋ** was maintained for a time but then lost, presumably through the umlaut of both ***a*** and **ə** to [**ɛ**]. Subsequently **-ɛïm**, like **-ɛïn**, underwent metathesis to **-ïɛm**. But the development was different with velar finals; perhaps, as I have suggested previously, under the pressure of the rhyme M. **kauŋ**, i.e. **kɛïuŋ**, tending to simplify to **kɛïŋ**, the head vowel of **kɛïŋ** < **k*a*ïŋ/kəïŋ** moved upwards, giving once more **kəïŋ**. Except after laryngal initials, the semivowel did not undergo metathesis but was lost, so that **-əïŋ** fell together with **-əŋ**.

The same principle can be applied when a final **-ð** or laryngal was lost:

-*a*lð (**-*a*rð**) > **-*a*ïð** > **-*a*ï** [**ɛï**] [**ɛ**]=M. **-a**

-*a*lĥ (**-*a*rĥ**) > **-*a*ïh** > **-*a*ï** [**ɛï**] [**ɛ**]=M. **-a**

-əlð (**-ərð**) > **-əïð** > **-əïy** (M. **-aəi**), later falling together with **-*a*ïy** < ***a*lts** (**-*a*rts**) (M. **-ai**ˇ)

-əlĥ (**-ərĥ**) (> **-əï**) > **-əïy**

The situation is more complicated when there was another semivowel —**y**, **w**, or **ð** (**l**)—in the same syllable and I shall leave aside for the present the problem of working out the various possibilities.

There will no doubt be a greater tendency to take exception to the suggestion that Old Chinese could have had syllables like **karm**, **kərk**, than to the parallel suggestion about **-y-**. Apart from the difficulties about the rhymes, where the situation is very much the same as with **-y-**, final clusters with **-l-** or **-r-** seem to be quite unknown among present day Far Eastern languages. An *a priori* objection based on this observation has however only limited force with regard to Chinese of two thousand years ago and, on the other side, the attractiveness of the theory for its explanatory power seems to me to be very great.

It may be worth noting that in a case like M. **kaək-kwən** < ***kelk** (***kəyrk**)**-kwən**=Qïrqïr, Kirghiz, the accuracy of the transcription would be improved by supposing **-l-** (**-r-**) at the end, rather than the beginning, of the syllable (*Asia Major* 1962, p. 122). This could also apply to M. **kam** < ***kalm** (***karm**)- =Khulm-, but the case is not so clear because of the variants with M. **lam** (loc. cit.). It would not apply to **·*a*-man** < **·*a*ð-m*a*ïn** < ***·*a*ð-m*a*ln** (**m*a*rn**)=Armenia but this is considerably later in time and the **-l-** may have already been vocalized. It would also not apply to M. **ĥou**ˊ**-phak**=*ἄρπαξ*? "amber", but this is in any case a very uncertain equation (p. 124). It would also not apply to M. **sou-ĥaəi**ˇ=Soγδak (p. 125) but I now think that this is also an incorrect equation. I suspect that it conceals rather the name of the Sacaraucae, *Σαγάραυλοι*, etc., in which case it would agree.

If we can thus replace **-ya-/-yā-**, **-yə-/yə̄-**, **-la-/lā-**, **-lə-/-lə̄-** by **-ay-/-ya**, **-əy-/-yə-**, **-ar-/-ra-**, **-ər-/-rə-**, it suggests that we may ultimately be able to dispose in some similar way of other cases in which it was necessary to postulate a contrast between long and short vowels in Old Chinese in order to account for the alternation between yodized and nonyodized *Ch'ieh-yün* rhymes. Another factor to be considered is obviously medial **-ð-**, and also combinations of more than one semi-vowel. At the same time the argument that often Middle Chinese **-i-** is to be ignored in pre-T'ang transcriptions retains its validity. Further study will be necessary before it is possible to work out a satisfactory theory and further discussion of the problem must be left aside for the present.

The vowel system of Written Burmese

The vowel system here proposed for Old Chinese turns out to be remarkably similar in its general features to the analyses of Modern Pekingese made by Hartmann (1944), Hockett (1947) and Rygaloff (1955). Though their formulations differ in detail, they are in agreement in having as nuclei only two, or three, central head vowels, distinguished by height, which may be variously combined with semivowels. Stimson (1961) argues that such an analysis is applicable to many other Chinese dialects. The prosodic analysis by Halliday (1959) is also in essential agreement. An examination of the phonology of Burmese as shown in its traditional orthography suggests that a similar analysis is applicable there also.*

Burmese is written with a variety of Indian alphabet descended from a form used in writing Pali scriptures, then adapted for Mon and finally taken over and further adapted by the Burmese. Since the present orthography was adopted, the pronunciation has evidently changed considerably but it seems reasonable to assume that it was once much closer to that implied by the spelling. Clues about still earlier stages of the language are provided by the more archaic orthography of the Old Burmese inscriptions. Much of this material is at present difficult of access for the non-specialist but one inscription, that of Myazedi, has been fully published and studied by a number of scholars. (See especially Nishida 1954, 1955, with earlier bibliography.)

Burmese is basically monosyllabic in structure like Tibetan and Chinese. There are certain proclitic prefixes of which the commonest is *a-*, probably corresponding to Tibetan *h-*. Reduplicative formations are also common as in other Sino-Tibetan languages and the sandhi features of juncture in compound words must be taken into account in a description of

* I am grateful to Mr. H. Shorto for comments and advice about problems of the Burmese and Mon writing systems.

the modern spoken language. For my present purpose however these features may be ignored and I shall discuss only the structure of the isolated major syllable consisting of an initial consonant or consonantal cluster, a vowel, and a final which may be stop, nasal or zero. Syllables which are closed by a nasal or zero are in one of three tones, designated as level, creaky or heavy.

The following simple initials (in Indian terms) are found in native Burmese words in Judson's *Burmese English Dictionary*: *O*; *k, kh, g, ṅ*; *c, ch, j, ñ*; *t, th, d, n*; *p, ph, b, bh* (apparently simply a graphic variant for *b*), *m*; *y, r, l, w*; *s, h*. The aspirated sonants *hṅ, hñ, hn, hm, hr, hl, hw*, are graphically clusters but may be regarded phonologically as simple initials corresponding to the aspirated stops. Initial clusters are found with *w* (all types of initial), *y, r, yw, rw* (velar and labial series—also *ly, hly*).

The following consonantal signs occur as syllabic finals: *k, ṅ*; *c, ñ*; *t, n*; *p, m*; *y* (in the spelling of the vowel *ai* in level tone). Anusvara (*ṁ*) is used as an alternative spelling for final *m*. Visarga (*ḥ*) is used to mark the heavy tone after nasals and certain vowel signs. A subscribed dot is similarly used to mark the creaky tone.

The vowel signs that are used are (in Indian terms): *a* (inherent in the consonantal signs when not stopped by the virama), *ā, i, ī, u, ū, e, ai, o* and a complex vowel sign peculiar to Burmese consisting of the sign for *i* above the consonant (or initial *a*) and the sign for *u* below. The last named sign is usually transcribed as *ui*. Short *a, i, u* have inherently creaky tone. They are complemented by *ā, ī, ū* in level tone and *āḥ, īḥ, ūḥ* in heavy tone. This orthographic convention has sometimes been taken as meaning that there was a phonemic distinction of vowel length in Burmese but in fact the length distinction is exactly correlated with the tones. One can possibly explain the spelling convention in terms of Mon usage, in which the short vowels were always accompanied by a final glottal stop when not followed by any other final consonant and the final long vowel signs were used only for open syllables in foreign loan words. (See *Asia Major* 1962, p. 211.) In Old Burmese a small *a* was used as a marker for final glottal stop (=creaky tone).

The tones are distinguished in various ways with the other vowel signs. The vowels *e* and *ui* are inherently level and the two tone markers (subscribed dot and visarga) are used to mark the other two tones. The vowel *ai* has inherently heavy tone. It is marked with subscribed dot to mark creaky tone and is written *ay* to indicate level tone. The vowel *o* is also inherently in heavy tone and is dotted for creaky tone. Level tone is indicated by the use of virama on the vowel sign, otherwise only employed to stop the inherent vowel of a consonantal sign.

The following is a list of possible finals transcribed as spelt. The modern pronunciation as given in Stewart 1945 is indicated in square brackets.

	Level	Creaky	Heavy		Final Stop	
(*a*)	*ā*	*a*	*āḥ*	[*a*]		
	aŋ	*aŋ.*	*aŋḥ*	[*iŋ*]	*ak*	[*ɛʔ*]
	aṅ	*aṅ.*	*aṅḥ*	[*iŋ, i, ɛ*]	*ac*	[*iʔ*]
	an	*an.*	*anḥ*	[*aŋ*]	*at*	[*aʔ*]
	am	*am.*	*amḥ*	[*aŋ*]	*ap*	[*aʔ*]
(*i*)	*ī*	*i*	*īḥ*	[*i*]		
	in	*in.*	*inḥ*	[*eiŋ*]	*it*	[*eiʔ*]
	im	*im.*	*imḥ*	[*eiŋ*]	*ip*	[*eiʔ*]
(*u*)	*ū*	*u*	*ūḥ*	[*u*]		
	un	*un.*	*unḥ*	[*ouŋ*]	*ut*	[*ouʔ*]
	um	*um.*	*umḥ*	[*ouŋ*]	*up*	[*ouʔ*]
(*e*)	*e*	*e.*	*eḥ*	[*e*]		
(*ai*)	*ay*	*ai.*	*ai*	[*ɛ*]		
(*o*)	*oʻ*	*o.*	*o*	[*ɔ*]		
	oŋ	*oŋ.*	*oŋḥ*	[*auŋ*]	*ok*	[*auʔ*]
(*ui*)	*ui*	*ui.*	*uiḥ*	[*o*]		
	uiŋ	*uiŋ.*	*uiŋḥ*	[*aiŋ*]	*uik*	[*aiʔ*]

Though the vowel *ai* is now pronounced as a monophthong, the spelling, especially the use of the consonantal sign *y* to indicate the level tone, would predispose one to regard it as diphthongal in origin. This analysis is confirmed by the fact that in the Myazedi orthography it is always spelled *āy*. (Level and heavy tones are not distinguished; creaky tone is marked, as after other consonantal signs, by a small *a* to indicate a glottal stop.)

The vowel *e* has exactly the same distribution as *ai*, that is, it occurs only in open syllables. One would therefore expect it to be structurally similar. In fact it is always written as *iy* in Old Burmese. The open/close contrast found in Old Burmese between *āy* and *iy* is retained in the modern pronunciation with open [*ɛ*] and close [*e*] respectively.

The vowels written *o* and *ui* also form a pair with the same distribution, occurring only before *-O*, *-k* and *-ŋ*. As far as *o* is concerned, it can readily be analysed as a diphthong */aw/*. It is in fact sometimes transcribed as *au*, and *-oŋ*, *-ok* are pronounced as [*auŋ*] [*auʔ*] at the present day. The development to a monophthong [*ɔ*] in open syllables is parallel to the change of *ai* to [*ɛ*]. Myazedi orthography confirms the analysis, for it writes *ow* in open syllables. The later practice of indicating the level tone with the virama is perhaps an abbreviation of *-ow*, like *ay* for the level tone of *ai*. The fact that Myazedi has *ow*, not *aw*, no doubt indicates a rounding of the vowel in the presence of *w*, but this can probably be regarded as non-phonemic. We also find *-wo*, *-won* (or even *-on* alone) for Written Burmese *-wa*, *-wan*. Open *o*, not followed by *w*, appears to be an alternative spelling for *u*, and never corresponds to Written Burmese *o*.

Distributionally *ui* is to *o* as *e* is to *ai*. This leads naturally to the hypothesis that it is phonologically */iw/*. The development of a close [*o*] in open syllables in modern pronunciation is exactly parallel to the development of *iy* to [*e*]. The development to [*aiʔ*] [*aiŋ*] before *-k* and *-ŋ* is not parallel and requires some separate explanation. (Mr. Shorto informs me that there is some reason for suspicion that words in *-uik*, *-uiŋ* may not be native Burmese; but at any rate they already occur in the inscriptions.) If the sign *ui* was invented by the Burmese, and subsequently borrowed back by the Mons (and Mr. Shorto informs me that the evidence could allow of such an interpretation), one would suppose that it was originally intended to be read *iu*. Myazedi orthography, which always closes it by the sign *-w* in open syllables in level or heavy tone, appears to confirm this view. Besides the spelling *-uiw* (read: *-iuw*), one finds *-iw* and *-eiw*. In words having creaky tone in later Burmese the final *-w* is dropped, being replaced by the sign for glottal stop. This corresponds to the usage with final *-k* and *-ŋ*. Spellings *-iʔ*, *-eiʔ* also occur, possibly indicating a very short pronunciation in which the final *-u* was much reduced.

(N.B. The significance of *e* in the Myazedi orthography, which has nothing to do with Written Burmese *e* (=Myazedi *iy*) is not clear. Shafer 1943, p. 326 n. 31, supposed that it was equivalent to *ya* on the basis of the spelling *het* for the word for "8", Written Burmese *hrac*, cf. Tibetan *brgyad*, The spelling *hyat* is actually found in another inscription. Other cases are *leh*=Written Burmese *laṅḥ*, *teh*=Written Burmese *taṅḥ*, *eʔ*, *yeʔ*=Written Burmese *i*, and *hleŋʔ*, which Shafer interprets as Written Burmese *hylaŋ* (but the tone is wrong—this is also true of Nishida's conjecture *hloŋ*). The use of final *-h* in two of these words is of interest. It apparently has nothing to do with the later use of visarga to indicate the heavy tone. Apart from its use in the above particles, it is used consistently in the word *rwoh*=Written Burmese *rwā* "village". It is tempting to see it as a relic of Sino-Tibetan final *-ĥ*.)

Finally, the vowel *u* of Written Burmese can also be treated as complex, being phonemically equivalent to */wi/*. As evidence of this we may note the following points: (1) In Written Burmese *wi* is found only in words of Pali origin and a very few exclamations and words of onomatopoeic origin. This is also true of *wu*. The vowel *u* may therefore be regarded as in complementary distribution to *wa*. It is true that *u* does not occur in front of velar and palatal finals, whereas *wa* does; but this same restriction in distribution is also found with *i*. (2) Since Written Burmese *e* appears as *iy* in the Myazedi inscription, one would expect to find *we* written as *wiy*. In fact we find *uy*. (3) The subscript forms of *u* and *ū* in Burmese use the same hook as is normal in Indian alphabets. Initial *ū* is, however, written in a peculiar way, that is, it has the sign for *u* surmounted by the crossed circle used to mark long *ī*. There is also an alternative form of short *u* surmounted by the sign

for short *i*. These forms are not found in Mon. Though, as Mr. Shorto remarks, they may be no more than analogical extensions, they certainly suggest that at the time the orthography was established the vowel *u* was regarded as complex=*wi* or *ui*.

The seven vowels of written Burmese are thus reduced to two—*a* and *i* (presumably once a high central vowel [ɨ] rather than a close front vowel)—plus the semivowels *y* and *w*. The distribution of possible finals, abstracting tone, now appears as follows (including *w*, but not *y*, from the initial).

/i/		/it/	/in/	/ip/	/im/	/iy/	/iw/	/iwk/	/iwŋ/
/a/	/ak/	/aŋ/	/ac/	/aṅ/	/at/	/an/	/am/	/ap/	/ay/	/aw/	/awk/	/awŋ/
/wi/					/wit/	/win/	/wip/	/wim/	/wiy/[1]			
/wa/	/wak/	/waŋ/			/wat/	/wan/	/wap/	/wam/	/way/			

The chief blank in the distribution is the absence of *i* before velar and palatal finals. Comparative evidence makes it seem clear that the palatal finals, which are a peculiarity of Burmese among the Sino-Tibetan languages, are, in part, the result of the palatalizing of *-k* and *-ŋ* and that *-ac*, *-aṅ* supply the gap left by the absence of *-ik*, *-iŋ*. Cf. for example: Burmese *tac* "1": Tibetan *gcig*; Burmese *chac* "joint": Tibetan *tshigs*, Chinese 節 M. *tset* < ***tsəyk**; Burmese *maṅ* "name": Tibetan *miṅ* (*myiṅ* in early manuscripts), Chinese 名 M. **myeŋ** < ***myəŋ**; Burmese *mraṅ* "to sound": Chinese 鳴 M. **miaŋ** < ***mrəyŋ** or ***mryəŋ**. Further examples may be found in Shafer 1941, p. 20.

It remains to be seen whether this interpretation of the Burmese vowel system will prove acceptable to specialists in that field. I find it has great advantages from the point of view of comparative studies and in the next section I shall sketch in a preliminary way how it may help to understand the relationships between Burmese and Tibetan.

The Tibetan vowel system

Written Tibetan, with its apparently "normal" five-vowel system, looks at first sight like an exception to the pattern which we have found in Chinese and Burmese. But, whether or not the orthography really gives a true picture in this respect of how Tibetan was really pronounced at the time when it was committed to writing, when we look at the basic correspondences between Burmese and Tibetan vowels, it soon becomes apparent, at least in broad outline, how the five Tibetan vowels are related to the two-vowel pattern which we postulate as primitive in the Sino-Tibetan word family.

Comparisons between Burmese and Tibetan cognates have been made by several scholars, and, while only a limited degree of progress has been

[1] When *w* forms part of an initial cluster it cannot be followed by *w* in the final. The independent syllables *wiw*, *wiwk*, *wiwŋ*, *waw* are found, but Mr. Shorto informs me that they are probably all loanwords.

made in the reconstruction of prototypes, certain regular sound correspondences can be regarded as quite well established. As far as the vowels are concerned, the following equations are all well supported by examples. I shall give only a sample in each case. Further evidence can be found in the articles of Shafer 1940, and R. A. Miller 1957.

(1) Tibetan *a*=Burmese *a*
- T. *ṅa* "I": B. *ŋā*
- T. *nya* "fish": B. *ŋāḥ*
- T. *zla* "moon": B. *la*
- T. *lṅa* "5": B. *ŋāḥ*
- T. *tshwa* "salt": B. *chāḥ*
- T. *sna* "nose": B. *hnāḥ*

(2) Tibetan *e*=Burmese *i*
- T. *me* "fire": B. *mīḥ*
- T. *nye* "near": B. *nīḥ*
- T. *mje* "penis": B. *līḥ*
- T. *śes* "know": B. *si*

(3) Tibetan *i*=Burmese *e* (/iy/)
- T. *khyi* "dog": B. *khweḥ*
- T. *bźi* "4": B. *leḥ*
- T. *nyi* "sun", "day": B. *ne*
- T. *ḥchi-ba*, *śi-ba* "die": B. *se*

(4) Tibetan *u*=Burmese *ui* (/iw/)
- T. *ṅu-ba* "weep": B. *ŋui*
- T. *dgu* "9": B. *kuiḥ*
- T. *rku* "steal": B. *khuiḥ*
- T. *rus* "bone": B. *ruiḥ*

(5) Tibetan *o*=Burmese *u* (/wi/) or *wa*
- T. *tsho-ba* "fat, greasy": B. *chū*
- T. *tho-ba* "hammer", *mtho-ba* "large hammer": B. *thu* "to hammer"
- T. *ḥbo-ba* "to sprout": B. *phūḥ* "to bud"
- T. *so* "tooth": B. *swāḥ*
- T. *mtho* "a span": B. *athwā*

Except for a few cases of Tibetan final *-s*, these examples are confined to cases in which both languages have open syllables. When we have to do with final stops or nasals or with Tibetan *-r* or *-l*, the correspondences are not always the same. Thus, for example: T. *gsum* "3": B. *sum* (=/swim/ < */siwm/?); T. *dṅul* "silver": B. *ŋwe* (=/ŋwiy/ = */ŋwil/ or */ŋiwl/?; T. *drug*: B. *khrok* (=/khrawk/ < */khriwk/?). It will require a good deal more study before a complete system can be worked out but on the basis of the correspondences in open syllables the following points emerge very clearly:

(1) Tibetan *e* and *a* correspond to Burmese *i* and *ɪ*, that is to the two basic nuclear vowels *ə/a* which we postulate for Sino-Tibetan; (2) Tibetan *i* corresponds to Burmese */iy/*, Sino-Tibetan */əy/*—in Tibetan terms one would analyse it as */ey/*; (3) Tibetan *u* corresponds to Burmese */iw/*, Sino-Tibetan */əw/*—in Tibetan terms one would analyse it as */ew/*; (4) Tibetan *o* corresponds to Burmese */wi/*, sometimes also to */wa/*—in Tibetan terms one would analyse it as */we/* (note that *wa*, though rare, does occur in Tibetan spelling).

This is no more than a preliminary sketch of the problem and it remains to be seen how far such an analysis is useful in explaining the inner structure of Tibetan. It may be worth noting however that Sprigg 1961 draws attention to a system of vowel harmony in Lhasa Tibetan depending on a system of close/open contrast, which suggests that even today Tibetan, like Peking Chinese, shows traces of this apparently fundamental characteristic of the Sino-Tibetan language family.

It is also of interest to note that one of the main types of verbal ablaut in Tibetan consists of alternation between *e* in the present and *a* in the perfect and future (leaving aside the question of the imperative in which the characteristic *o* vocalism seems to be independent of the vocalism in the other forms). For example: *hgegs-pa* "hinder", Perf. *bkag*, Fut. *dgag*. According to my analysis this *e/a* alternation is in fact an alternation between close and open nuclear vowel: *ə/a*. The same type of alternation is common in Chinese word families though there is in Chinese no formalized system of verbal conjugation, e.g.:

序 M. **ḍiə˨˦** "to store, prepare": 儲 M. **ḍio** "a store"

置 M. **ṭiə** "set, place, arrange": 著 M. **ṭio˥˩** "place, order of place, position"

碍, 礙 M. **ŋəi˥˩** "obstruct": 忤 M. **ŋou˥˩** "oppose" (cf. Tibetan *hgegs-pa* "obstruct")

貽 M. **yə** "give": 予 M. **yo˨˦** "give"

而 M. **ńiə**, connective particle: 如 M. **ńio** "like, if"

等 M. **təŋ˨˦** "step, class": 黨 M. **taŋ˨˦** "class, category"

譚 M. **dəm** "speak about": 談 M. **dam** "speak, converse"

嘾 M. **dəm˨˦** "keep in the mouth": 啖 M. **dam˨˦** "devour"

合 M. **ĥəp** "join, unite, shut": 盍 M. **ĥap** "to thatch, cover"

依 M. **·iəi** "to lean on": 倚 M. **·ie˨˦** "to lean on"

蟻 M. **ŋiəi˨˦** "ant": 蟻 M. **ŋie˨˦** "ant"

微 M. **miəi** "small; there is not": 靡 M. **mie˨˦** "small; there is not".

隤 M. **dwəi** "collapse": 墮 M. **dwa˨˦**, **hywe˨˦** "destroy, overthrow"

尸 M. **śii** "set forth, display": 施 M. **śie** (< **-aδ**) "spread out, expose"

皐 M. **kau** (< **-əwĥ**) "high": 高 M. **kau** "high" (< **-awĥ**)

學 M. **ĥauk** "learn, school", 斆 M. **ĥau˥˩** "teach" (both from **-əw-**): 效 M. **ĥau˥˩** "imitate, follow, give instructions to", 校 M. **ĥau˥˩** "school" (both from **-aw-**).

Many other examples can be added, and even more if one takes into account cases where *ə/a* contrast (and sometimes tone) are not the only differences between the words, e.g. 似 M. **zi̯ə˨˦** "resemble": 像 M. **zi̯aŋ˨˦** "resemble, image". Many cases will be found listed among Karlgren's Word Families (1934).

It would take much lexicographical investigation to determine the nature of the grammatical and semantic distinctions associated with this *ə/a* contrast in every case. Sometimes, as in the words for "ant", there may have been no distinction at all. In other cases, such as the first and second examples, there clearly was, the *ə* form being, apparently, active and the *a* form referring to the completed action or its result, being analogous therefore to the distinction between the present and perfect aspect. In Tibetan also we find cases of nouns with *a*, clearly cognate to verbs in *e/a*, e.g. *gag-pa* "swelling in the throat" *hgegs-pa* "hinder, stop"; *khal* "load": *hgel-ba* "to load".

The other main class of ablauting verbs in Tibetan has *o* in the present and *a* in the perfect and future. It seems likely that this represents a labialized form (***wə/wa**) of the same *e/a* contrast. Tibetan *o*, as we have seen, sometimes corresponds to ***wa**, as well as to ***wə**, but there may have been circumstances in which ***wa** gave *a*. It must be remembered that there were probably two sources of labialization, the semivowel ***w** and the labiovelar and labiolaryngal initials. Further study will be needed to substantiate this hypothesis.

Conclusion

Two-term vowel systems are not confined to East Asia. In fact they are probably best known to linguists from descriptions of the Northwest Caucasian languages, notably the work of W. S. Allen on Abaza (1956) and A. H. Kuipers on Kabardian (1960). Furthermore both Allen and Kuipers draw attention to the fact that recent theories on proto- or pre-Indo-European also reduce the vowel system to a two-term pair *e/o* (Germanic *i/a*)—or even to a single term (Lehmann 1955)— and have drawn attention to other structural analogies between the two groups of languages. For instance, the zero/*a* alternation in Kabardian (phonetically *ə/a*) between what Kuipers call "extrovert" and "introvert" forms is certainly analogous to Indo-European ablaut. (Kuipers likens it to quantitative ablaut but the "extrovert"/"introvert" contrast seems more analogous to the verb/noun, present/perfect contrast associated with qualitative (*e/o*) ablaut). If Sino-Tibetan now turns out to have the same underlying pattern, it cannot fail to be of great interest and to call for some explanation. This is a question to which I hope to return in the near future.