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VOWEL HARMONY IN LHASA TIBETAN¹: PROSODIC ANALYSIS APPLIED TO INTERRELATED VOCALIC FEATURES OF SUCCESSIVE SYLLABLES

By R. K. SPRIGG

I. THE CLOSURE SYSTEM

IN his phonemic analysis of Lhasa Tibetan in *Love songs of the sixth Dalai Lama Jaw Yuanrenn* (Y. R. Chao) notices 'variations' of some of the phonemes, and ascribes some of these 'variations' to differences in tempo or to chance: of the phoneme that he writes as 'e' he says '有時候也變成 *ɪ*, 例如 10 首 3 句 *khrel gzhung* tʂ'elɛuŋ 讀作 tʂ'ɛlɛuŋ' [it may sometimes change to *ɪ*, e.g. in song 10, line 3, *khrel gzhung* tʂ'elɛuŋ is pronounced tʂ'ɛlɛuŋ]; of the phoneme 'a', '快讀的時候會變成 *ə*, 例如 4 首 2 句 *lam buhi* lamp'ø 讀作 læmpø' [it may change to *ə* in rapid speech, e.g. in song 4, line 2, *lam buhi* lamp'ø is pronounced læmpø]; and of the phoneme 'o', '偶爾讀成 *u*, 例如 36 首 3 句 *rlung po* luŋpo 讀作 luŋbu' [it may occasionally be pronounced *u*, e.g. in song 36, line 3, *rlung po* luŋpo is pronounced luŋbu]²; but a phonological analysis of the speech of Rinzin Wangpo (*rig-'dzin dbang-po*) (R.), a Lhasa-dialect-speaking Tibetan, overwhelmingly suggests that vowel alternations such as these should be attributed to vowel harmony.³

The Lhasa-Tibetan vowel harmony is of the type in which degrees of vowel

¹ This article is based on a paper, 'Vowel harmony in Lhasa Tibetan', read at the twenty-fifth International Congress of Orientalists, Moscow, in August 1960. Vowel harmony was chosen as the subject of this paper as a compliment to the late Professor Georges de Roerich (Ю. Н. Рерих), of the Institute of Peoples of Asia of the Academy of Sciences of the U.S.S.R., with whom its author had discussed this aspect of Tibetan phonology some ten years ago in India.

In the phonological analysis presented in this article, following F. R. Palmer, "Openness" in Tigré: a problem in prosodic statement', *BSOAS*, xviii, 3, 1956, 561, *vowel* and *consonant*, and their derivatives (vocalic, consonantal), are used as purely phonetic terms; for phonological units of Syllable structure V and C are used. A particular term in a V system, e.g. A, may have one or more vowels stated as its phonetic exponents. With *vowel* used in this phonetic sense the term vowel harmony refers to a relationship not of structural units but of vocalic, and therefore phonetic, features; but Lhasa Tibetan is also a vowel-harmony language in the traditional use of this term: 'the peculiar restriction . . . of tolerating only certain combinations of vowels in successive syllables' (L. Bloomfield, *Language*, London, 1950, 181). There is thus a twofold sense in which the title of this article is appropriate to the material presented in it.

² *Love songs of the sixth Dalai Lama Tshangs-dbyangs=rgya-mtsho*, translated into Chinese and English with notes and introduction by Yu Dawchuan, and transcribed by Dr. Jaw Yuanrenn (Y. R. Chao) (*Academia Sinica*, Series A, No. 5, Peiping, 1930), 8-9. I am indebted to my colleague Mr. H. Simon for a translation of the relevant passages.

³ R. was born and educated in Lhasa. He was employed as Research Assistant by the School of Oriental and African Studies for the period December 1948-September 1949, in London. The material obtained from R. was checked against the utterances of other speakers of the Lhasa dialect in Kalimpong (West Bengal) and in Gyantse (Tsang Province, Tibet) during the session 1949-50.

closure are interrelated. These vowel-closure features are treated here as exponents of terms in a prosodic system named, since it has to do with inter-related degrees of vowel closure, the Closure system.¹

Prosodic analysis, with its emphasis on syntagmatic relations, would seem to be particularly well suited to dealing with interrelated vocalic features of successive syllables²; and in order to illustrate the advantages that are claimed for it over other types of phonological analysis, and particularly over phonemic analysis, the account of the Closure system is followed on pages 135–8 below, by a brief comparison with a representative phonemic analysis of the same material.

The Closure system comprises two terms: Close, Open. It is applicable to certain groups of two successive Syllables, which are termed Closure Pieces, i.e. Pieces for which the Closure system is statable.³ These Closure Pieces may be coextensive with a Word, provided, of course, that it is disyllabic; but commonly they are contained within a Word, a Word, that is, of three or more Syllables.

The relevant vowel-closure features of the two Syllables comprised in the Piece are treated as features of the Piece as a whole unit, in much the same way as certain other phonetic features, pitch features, for example, and duration features, are ascribed not to individual phonemic units (terms in C and V systems) but to Syllable units and Word units as wholes.

Since the Closure system comprises only the two terms Close and Open, a given example of the Closure Piece must be either an Open Closure Piece (or Open Piece, oP) or a Close Closure Piece (or Close Piece, cP).

A Closure Piece can in all circumstances be identified as Close or as Open through the application to it of phonetic criteria. A particular vocalic feature or set of coarticulated features of either the first or second Syllable of the Piece may be adequate for the purpose of identifying the Piece, and may therefore serve as a phonetic criterion without reference to features of the other Syllable (pp. 129–30); or it may be necessary to cite as a phonetic criterion vocalic features drawn from both Syllables of the Piece (pp. 130–1), or even to include intervocalic consonantal features in the criterion (pp. 131–2).

The material presented in this article lends itself to drawing a distinction between phonetic criteria, whose function is to provide grounds for identification, and phonetic exponents, whose function is to substantiate the abstractions made at the phonological level, and to ensure 'renewal of connexion'.⁴ The

¹ For 'prosodic system' see J. R. Firth, 'Sounds and prosodies', *TPS*, 1948, 127–52. Subsequent publications that distinguish prosodic and phonemic categories are listed at *BSOAS*, XIII, 4, 1951, 945, and *BSOAS*, XVII, 1, 1955, 134.

² See also Palmer, "'Openness'", 561, and J. Carnochan, 'Vowel harmony in Igbo', *African language studies*, I, 1960, 156.

³ When used as phonological terms Syllable, Word, Piece, Closure, etc., are distinguished by capital letters.

⁴ Palmer, "'Openness'", 577.

aim that determines which phonetic features are cited as phonetic criteria of a phonological term (e.g. the Close or the Open term of the Closure System), is thus very different from the aim that determines which features should be stated as exponents of that term, though it may be that the same feature, or set of coarticulated features, or sequence of features, will appear among both exponents and criteria, but where, however, two or more terms of a system have some exponents in common (pp. 129, 130-2), the common features clearly cannot be stated as criteria.

The exponents of the two Terms of the Closure system are stated first ; and the distinction between phonetic exponent and phonetic criterion is then illustrated by listing those features from the statement of exponency that can also serve as criteria, and by supplementing them with other, and especially consonantal, features, wherever identification of the Close or Open term is impossible from the features stated as exponents (pp. 131-2).

A Closure Piece can be classified grammatically, on formal grounds, as of one of five types : (a) Noun ; (b) Noun + Particle ; (c) Adjective + Particle ; (d) Particle + Particle (Verbal) ; (e) Verb + Particle.¹ The following examples of each of these five grammatical types of Closure Piece have been chosen because they clearly show what is taken to be an alternation of exponent for one and the same V term ; but, simply because attention is, for the purposes of exposition, focused on only one Syllable of each Piece rather than on both simultaneously, it must not be overlooked that each of these alternative exponents has a harmonizing degree of vowel closure characterizing the remaining Syllable of its Piece. Thus, in example (i) of section (a), the alternation of half-openness (ɛ) with half-closeness (e) as exponents of the particular V term of the first Syllable (*skad*) in both the oP example *skad-cha* and the cP example *skad-bsgyur* must not be allowed to obscure the fact that the matching degrees of vowel closure of the second Syllable in each (ə and u respectively) are of equal significance for the Closure system ; but, since it is the alternation in exponency that provides the phonological problem considered in this article, the alternative exponents have nevertheless been abstracted from each Piece, and are symbolized in the right-hand column below.²

¹ Since the Piece is either coextensive with, or contained in, the Word, it follows that more than one grammatical category can be exemplified in the Word as well as the Piece : the examples given at (b), (c), and (e) below can also serve as examples of Noun-+-Particle, Adjective-+-Particle, and Verb-+-Particle, Words. The examples *bzhes-kyi-yod-pas* and *rgyab-kyi-yin-pas* at (d) are also examples of the Verb-+-Particle Word. The examples at (a), on the other hand, exemplify a single grammatical category, the Noun, and are termed Noun Words ; the second Word of the examples at (e, ii), *gnang*, exemplifies the Verb category only, and is termed a Verb Word.

² It has been assumed that it is legitimate to treat a given phonetic feature as available for statement as an exponent of more than one term, whether prosodic or phonematic. In this particular instance it is the feature half-openness (ɛ) that is shared by the V term of the Syllable *skad* with the exponent of the Open term of the Closure system, which embraces vowel features of both Syllables of the Piece (ɛ — ə). For a discussion of whether such an overlap is permissible, see Palmer, ‘ “ Openness ” ’, 576-7.

(a) Noun						
(i)	{	oP	ce:dzø	<i>skad-cha</i>	speech	ɛ ¹
	cP	ce:ʒu:	<i>skad-bsgyur</i>	interpreter	e	
(ii)	{	oP	phø:ge:	<i>bod-skad</i>	Tibetan	ɛ
	cP	ɖu:ge:	<i>'brug-skad</i>	Bhutanese	e	
(b) Noun + Particle						
		oP	pha:lø	<i>bar-la</i>	between	a
		cP	pha:tø	<i>bar-du</i>	as far as	ʌ
(c) Adjective + Particle						
		oP	{ maŋbø maŋgø }	<i>mang-po(go)</i> ²	many	a
		cP	dzɛŋgø	<i>ljang-khu</i>	green	ʌ
(d) Particle + Particle (Verbal)						
		oP	-jøβɛ:	<i>bzhes-kyi-yod-pas</i>	do you eat	ɛ
		cP	-jumbe:	<i>rgyab-kyi-yin-pas</i>	shall you print	e
(e) Verb + Particle						
(i)	{	oP	{ tɛa:bø- tɛa:rø- }	<i>bcar-ba(ra)-yin</i>	I visited	a/a
	cP	tɛa:gø-	<i>bcar-gyi-yin</i>	I shall visit	ʌ	
(ii)	{	oP	nā:ɾø:	<i>gnang-rog gnang</i> ³	please give	ə
	cP	lʁbɾø:	<i>bslabs-rog gnang</i>	please teach	o	

The above examples have been included in order to demonstrate that the Closure system is applicable to Pieces of any of the above five types ; but this article is from this point onwards restricted to a detailed study of type (e), Verb + Particle.

II. VERB-+-PARTICLE TYPE OF PIECE

For the sake of clarity in exposition it is again useful to take first examples of Pieces that contain Syllables whose V terms have alternative exponents, like *bcar* (**a/a** and **ʌ**) and *rog* (**ə** and **o**) already illustrated, though by no means all Verb Syllables and Particle Syllables have V terms with alternative exponents.⁴ Only four, in fact, of the Particle Syllables that can be exemplified

¹ The phonetic transcriptions, in the International Phonetic Alphabet but with the addition of \bar{V} (non-velarity), show no more detail than is relevant to this account of vowel harmony ; pitch features, therefore, have not been symbolized.

² The forms in round brackets are phonetic spellings, put immediately after the regular orthographic form with which they alternate.

³ The spaces between words, for which there is no warrant in Tibetan orthography, reflect the delimitation of words on formal (phonological and grammatical) grounds.

⁴ Referring to Syllables by their phonological formulae rather than by their orthographic forms, though theoretically preferable, would in practice result in unjustified complications, and would pose more questions than it answered, as may be seen from a comparison of *gnang*, the orthographic form of one of the Verb Syllables, with its phonological formula ${}^1\eta^{\bar{v}}NV$, in which the indices indicate the prosodic classification of this syllable as Tone One (of a two-term Tone system, referable to the Word), as η (of an eight-term Quality system, referable to a monosyllabic or disyllabic Piece), as \bar{v} (of a three-term Labiality system, referable to a monosyllabic Piece), and as v (of a three-term Glottality system, referable to a monosyllabic Piece), while N specifies the N term of a C phonematic system, and V the sole member of a V system.

in the Verb+-Particle type of Piece have V terms with alternative exponents : the Interrogative-Particle Syllable *pas/gas/ngas/ras* (henceforth referred to simply as *pas*), the Nominalizing-Particle Syllable *rog*, the Dubitative-Particle Syllable *a*, and the Negative-Particle *ma/mi*.¹ The Closure system is illustrated first from Pieces containing *pas* and *rog*.

A. Pieces containing *pas* and *rog*

First to be considered are examples of the Close Piece. In each of these the V term of the second Syllable (*pas* or *rog*) has its closer degree of vowel closure, half-closeness (e and o respectively) ; and a harmonizing vowel-closure feature characterizes the first Syllable, the Verb Syllable. This harmonizing vowel-closure feature is either (i) closeness (i, ɪ, y, œ, u) or (ii) half-closeness combined with backness and spreading (ɤ) :

- | | | |
|------|--|---------------------------------------|
| (i) | { first Syll. : closeness (i ɪ y œ u) ²
{ second Syll. : half-closeness (e o) | |
| | <i>rang bod-pa yin-pas</i> (jumbɛ:) | are you a Tibetan |
| | <i>gzigs-mo gzigs-pas</i> (si:be:) | did you see the show |
| | <i>gsol-ja zhus-pas</i> (ɛy:be:) | did you serve tea |
| | <i>khang-pa 'di skyid-po 'dug-gas</i> (dɔŋe:) | is it an attractive house |
| | <i>rgyal-rtse-la bzhugs-pas</i> (ɛu:be:) | did you stay in Gyantse |
| | <i>zin-rog</i> (sum:ɔ:) <i>gnang</i> | please catch it |
| | <i>dris-rog</i> (tɕi:ɔ:) <i>gnang</i> | please ask him |
| | <i>phul-rog</i> (phy:ɔ:) <i>gnang</i> | please offer it |
| | <i>zhu-rog</i> (ɕɔ:ɔ:) <i>gnang</i> | please request |
| | <i>blug-rog</i> (lu:ɔ:) <i>gnang</i> | please pour it out |
| (ii) | { first Syll. : half-closeness + backness + spreading (ɤ)
{ second Syll. : half-closeness (e o) | |
| | <i>khang-pa mdaŋ ge rgyab-pas</i> (ɣɤbe:) | have you swept this room ³ |
| | <i>bod-skad bslabs-rog</i> (ɣɤb:ɔ:) <i>gnang</i> | please teach (me) Tibetan |

In the Open Piece, on the other hand, the V terms of the second Syllables *pas* and *rog* have as exponent their more open degree of vowel closure : half-openness (ɛ and ɔ respectively) ; and harmonizing vowel-closure features,

¹ Prosodic analysis enables two or more phonetic forms, which may or may not be differently symbolized in the orthography, to be associated with a single phonological structure, as exponents of units of that structure under differing prosodic conditions. Thus, the phonetic forms **be:**, **ge:**, **ŋe:**, and **ɛe:** can all be stated as exponents of the C and the V terms of the Interrogative-Particle Syllable variously symbolized in Tibetan orthography as *pas*, *gas*, *ngas*, or *ras*, in one or other of eight prosodically differing types of disyllabic Piece covering not only the relevant features of this Particle Syllable, but also associated features of the preceding (Verb) Syllable. Similar prosodic statements provide grounds for associating various phonetic forms with the single phonological structures symbolized as *ma/mi* (Negative Particle), *pa/ba/ga/nga/ra* (Past Particle, Nominalizing Particle), and *gi/gyi/kyi*.

² The term closeness is used for a tongue position higher than half-close ; it therefore includes ɪ and œ.

³ C. A. Bell, *Grammar of colloquial Tibetan*, Alipore, 1939, 136.

which may be summarized as non-close, characterize the first Syllable (Verb) :
openness (a, a, o), half-openness (ɛ, ə), half-closeness + frontness (e, ø) :

first Syll. : non-closeness (a a o ɛ ə e ø)

second Syll. : half-openness (ɛ ə)

snyug-se (ser) yod-pa gnang-ngas have you any dark yellow ¹
(naŋɛ:)

rtswa-chag yag-po ster-ras (tɛɛ:) did you give plenty of fodder ²

Connaught Hall-la *bsdad-pas (dɛ:bɛ:)* did you stay at Connaught Hall

rkang thang-la yong-ngas (jɔŋɛ:) did you come on foot ³

rgyal-rtse-la phebs-pas (phɛ:bɛ:) did you come to Gyantse

gsol-ja bzos-pas (sø:bɛ:) did you make tea

gnang-rog (nã:ɔ:) *gnang* please give

phye-rog (tɕhɛ:ɔ:) *byed* would you open

bstan-rog (tɛ:ɔ:) *gnang* please show

nyo-rog (nɔ:ɔ:) *byed* would you buy

yong-rog (jɔ:ɔ:) *byed* would you come

phebs-rog (phɛ:ɔ:) *gnang* please come

skyon-rog (cɕ:ɔ:) *gnang* please print

In Pieces in which the second Syllable is either *pas* or *rog*, then, the exponents of the two terms Close and Open are :

First Syllable	Second Syllable
<i>Close</i>	
(i) closeness (i ɪ y u ɔ)	} half-closeness (e ø)
(ii) half-closeness + backness + spreading (ɣ)	
<i>Open</i>	
non-closeness, except ɣ as above (a a o ɛ ə e ø)	half-openness (ɛ ə)

Two exceptions have been observed : **ɲβɛ:**, *red-pas*, and **tɕhɔŋɛ:**, *byung-ngas*, e.g.

gcig-pa red-pas (ɲβɛ:) is it the same

phebs-lam-la sku mnyel-po ma-byung- I hope you had a good

ngas (-dzoŋɛ:) journey ⁴

In these two examples one would have expected to find either half-closeness (e) as a feature of the second Syllable harmonizing with the closeness (ɪ ɔ) of the first, or, alternatively, a vowel other than ɪ or ɔ, but not i, u, y, or ɣ, as a feature of the first Syllable harmonizing with the half-openness (ɛ) of the second.

tɕhɔŋɛ: and **-dzoŋɛ:** can only be treated as exceptions ; but it is possible to account for the irregularity of **ɲβɛ:**. The V term of the Syllable *red* has

¹ *ibid.*, 165.

² Based on Sir Basil Gould and Hugh Edward Richardson, *Tibetan sentences*, O.U.P., 1943, 11.

³ *ibid.*, 102.

⁴ Gould and Richardson, *Tibetan language records, etc.*, Kalimpong, 1949, C 29.

alternative exponents: (i) closure between close and half-close, with some centrality (**ɮ**), as above in *red-pas*, and in **ɮba:**, *red-pa*, 'it is, is it not'; and (ii) half-closeness + frontness, with or without long duration (**e e:**). This alternation in exponency can be dealt with through a prosodic system that takes into account not only differences in closure and degree of frontness, but also duration and pitch, as a result of which *red* is classified as a Close/Open-Piece (c/oP) Verb (section B below).¹

The behaviour of the other two Particle Syllables that have V terms with alternative exponents, *a* (Dubitative) and *ma/mi* (Negative), differs from that of *pas* and *rog* as regards degrees of closure (*a*: **a/Δ**; *ma/mi*: **a(ɛ)/ɮ**), and also in the fact that the order of grammatical categories in Verb-+-Particle Words in which either of these two sub-categories of Particle is colligated with the Complement sub-category of Verb is, exceptionally, not Verb-Particle but Particle-Verb, e.g. *a-yin*, *a-yod*, *ma-red*, *mi-'dug*. Moreover, Words exemplifying these Particles contribute to solving the problem posed by **ɮβɛ:** and **tɕhɔŋɛ:/dzɔŋɛ:**.

The exponent of the V term of *a* is half-openness (**Δ**) in the Close, and openness (**a**) in the Open, Piece; that of the V term of *ma/mi* is closeness (**ɮ**) in the Close, and either openness (**a**) or half-openness (**ɛ**) in the Open, e.g.

<i>a</i>	{	cP	<i>chang'di yag-po a-yin</i> (ʔΔjĩ)	I doubt whether this beer is all right
		{	oP	<i>la a-yod</i> (ʔajɕ)
			<i>mang-po zhe-po a-yong</i> (ʔajɕ̃)	I should not think there are very many
<i>ma/mi</i>	{	cP	<i>tsha-ba tsha-sa'i mi-'dug-gas</i> (mundɔge:)	is it not a warm spot too
		{	oP	<i>mang-po zhe-po mi-yong</i> (mɛjɕ̃:)
			<i>la ma-red</i> (maɛe)	no, he is not

Openness (**a**) as a feature of the first Syllable of *ma-red* (**maɛe**) and *ma-byung* (**madzɔ̃**) is an oP criterion. It supports the classification of *red* as a c/oP Verb (pp. 121-2); it conflicts with the cP criterion closeness (**ɔ̃**) of the second Syllable of *ma-byung*, and therefore supports the classification of *byung* as irregular (p. 121).

No other single Particle Syllable has alternative exponents for its V term; but there is an alternation in the exponency of their V terms for combinations

¹ For a corresponding alternation in vowel duration to the **e(ɛ)** and **ɮ** of the V term of *red*, with or without a correlated alternation in vowel quality, cf. **du(ɛ)**, 'dug, and **doge:**, 'dug-gas (**u:/ɔ**); **jɕ(ɛ)**, *yod*, and **jɕβɛ:**, *yod-pas* (**ɕ:/ɕ**); **mɛ:**, *med(mad)*, and **mɛβɛ:**, *med(mad)-pas* (**ɛ:/ɛ**), all of them examples of the Complement sub-category of Verb (*red*, 'dug, *yod*, *med(mad)*, *yin*, *min(man)*, *byung*, *yong*).

² The difference in exponency of the V term of *ma/mi* in Words in which the Verb Complement is represented by *yong* and *red* is associated with the presence of initial palatality (**-ɛj-**) and non-palatality (**-aɪ-**) in the Verb Syllable, and would require a further prosodic statement.

of the Nominalizing Particle *pa/ba(ga/nga/ra)* with either the Genitive Particle *gi/gyi/kyi/-'i* or the Agentive Particle *gis/gyis/kyis/-s*: half-close (e) in the Close Piece, half-open (ε) in the Open (and therefore phonetically identical with *pas*), e.g.

cP	{	<i>ma yin-pas (jumbɛ:)</i>	through our not being
		<i>zhing-kha 'di btab-pa'i (tʂbɛ:)</i>	in order to sow this field ¹
		<i>don-dag-la</i>	
oP	{	<i>byas-pas (tʂɛ:bɛ:)</i>	on my saying
		<i>London-la phebs-pa'i (phɛ:bɛ:)</i>	your reason for coming to London
		<i>sku-don</i>	

The Particle Syllables *pas*, *rog*, *a*, and *ma/mi*, and the Nominalizing Particle *pa/ba(ga/nga/ra)* when combined with *gi/gyi/kyi/-'i* or *gis/gyis/kyis/-s*, can be contained in both the Close and the Open Piece; and, apart from the exceptional behaviour of Pieces containing *byung*, their V terms have as exponents alternative degrees of closure accordingly (e/ε, o/o, ʌ/a, ɿ/a(ε)). None of the other Particle Syllables that can be contained in the Verb+Particle type of Piece resembles them in this latter respect (alternation in the exponency of their V terms) ²; but the majority of these Particle Syllables can, like *pas*, *rog*, *a*, etc., be contained in both Close Piece and Open Piece. All such Particle Syllables are therefore termed Close/Open-Piece (c/oP) Particle Syllables to distinguish them from a minority that has still to be considered (Close-Piece Particle, p. 125), and to mark the fact that they may be contained in both prosodic types of Closure Piece (the remaining Particle Syllables are in fact confined to the Close Piece).

The following Particles are c/oP; most of them, listed in section (i), are written with the vowel letters *e* (*'greng-bu*) and *o* (*na-ro*), and with *a* (for which Tibetan orthography has no name) when not immediately followed by the letter *b*; but a few of them, listed in section (ii), are, however, written with *i* (*gi-gu*) and *u* (*zhabs-kyu*):

(i) *e*, *o*, *a* (except when followed by *b*)

se/ze, *med(mad)*; *rog*, *dwogs* (or *rdog*), *do*, *'gro(gro)*, *yong*, *yod*, *dgos(dgo, go)*, *myong(nyung)*, *song*, *long*; *pa/ba(ga/nga/ra)* (Nominalizing), *pa/ba(ga/nga/ra)* (Past), *pas/gas/ngas/ras*, *pa/ga/nga*, *mkan(nyan)*, *ga(ka, kag)*, *ta*, (b)*stangs*, *shag/zhag*, *sa*, *a* (Imperative), *a* (Dubitative), *byas*, *tsang*, *na*, *ya/yag*, *ma/mi*, *nas(ni)*.

(ii) *i*, *u*

shig, *bzhin*, (*ni*), *mi/ma*; *'dug*, *byung*, (*nyung*).

¹ Bell, *Grammar*, 53.

² With the possible exception of the Nominalizing Particle *dwogs*, or *rdog*, e.g. *yin-dwogs kha-po red* 'he may perhaps be', *'gro-rdog kha-po red* 'I might perhaps have to go' (Gould and Richardson, *Records*, C 42), and the Perfective Particle *med(mad)*, e.g. (oP) *'byor-mad-pa-no (dzo:mɛ:-)* 'have you not received', (cP) *bzhugs-mad-pa-no* ([ʔ] **ɕu:mɛ:-* or **ɕu:me:-*) 'is he not staying', for neither of which does the available material provide sufficient evidence.

B. Pieces containing Close/Open-Piece (c/oP) Verb Syllables

There are also Verb Syllables that resemble *pas*, *rog*, *a*, and the other c/oP Particle Syllables, in that they too are not restricted to the Close or the Open Piece but may be contained in either. These Verb Syllables are also therefore termed Close/Open-Piece (c/oP), to distinguish them from certain other Verb Syllables that behave differently, and to mark the fact that they may be contained in either type of Piece.

All the Verb Syllables that have so far appeared in this article in examples of the Open Piece (pp. 119, 121) are c/oP; but in spite of the fact that they have so far been exemplified only in the Open Piece, as c/oP Verb Syllables they can of course equally well be contained in the Close Piece. The Particle Syllables *pas* and *rog* thus provide a means of identifying c/oP Verb Syllables; for in Pieces containing a c/oP Verb Syllable, and in no other Pieces except *byung-ngas*, the V terms of *pas* and *rog* always have their more open exponents (ε \circ). The following Verbs, all of which have already been exemplified, are therefore c/oP: *gnang*, *ster*, *bsdad*, *yong*, *phebs*, *bzos*, *phye*, *bstan*, *nyo*, *skyon*, and *red*, but not *byung*.

Pieces containing c/oP Verb Syllables may usefully be considered at this point, because the majority of them, like *pas* and *rog*, have V terms with alternative exponents. A pair of examples is given for each Verb; in the first example of each pair each Verb is exemplified in an Open Piece, and in the second in a Close Piece. The alternative exponents of its V term are symbolized in the right-hand column; the exponents of the Close and Open terms of the Closure system are stated subsequently.¹

' <i>then</i>	{ oP <i>tha-mag</i> 'then-pa-red (thembə-)	he smoked	} ε/ι
	{ cP ,, 'then-gyi-'dug (thungt-)	he smokes	
<i>thon</i>	{ oP <i>thon-pa-red</i> (thembə-)	he set out	} \emptyset/γ
	{ cP <i>thon-gyi-'dug</i> (thnygy-)	he sets out	
' <i>gro</i>	{ oP 'gro-ba-red (drobə-)	they go	} \circ/ω
	{ cP 'gro-gi-'dug (drogy-)	they are going	
<i>bsdad</i>	{ oP <i>bsdad-pa-yin</i> (dɛ:bə-)	I stayed	} $\varepsilon:/e:$
	{ cP <i>bsdad-kyi-yin</i> (dɛ:ge-)	I shall stay	
<i>klog</i>	{ oP <i>klog-pa(ga)-yin</i> (lɔ:bə-/lɔ:ge-)	I read	} $\circ:/\circ:$
	{ cP <i>klog-gi-yin</i> (lɔ:gy-)	I shall read	
<i>yong</i>	{ oP <i>yong-ba(nga)-yin</i> (joŋbə-/joŋe-)	I came	} ν/ω
	{ cP <i>yong-gi-yin</i> (joŋgy-)	I shall come	
<i>gnang</i>	{ oP <i>gnang-ba(nga)-red</i> (naŋbə-/naŋe-)	he gave	} a/Δ
	{ cP <i>gnang-gi-red</i> (naŋge-)	he will give	
<i>bcar</i>	{ oP <i>bcar-ba(ra)-yin</i> (teɛ:bə-/teɛ:re-)	I visited	} a:/Δ:
	{ cP <i>bcar-gyi-yin</i> (teɛ:ge-)	I shall visit	

¹ Only the difference in degree of vowel closure is relevant here; but, since there are no generally accepted symbols for e.g. closeness, half-closeness, other features (frontness, spreading, etc.) are unavoidably symbolized as well.

The alternative degrees of vowel closure are, then, as follows :

	oP	cP		
(i)	half-close	close	ø(:)/y(:)	<i>thon mchod</i>
(ii)	half-open	close	ɛ/ɪ ø/ɔ	<i>'then 'gro</i>
(iii)	,,	half-close	ɛ:/e: ɔ:/o:	<i>bsdad klog</i>
(iv)	open	close	ʊ/ɔ	<i>yong</i>
(v)	,,	half-open	a/ʌ ɑ:(a)/ʌ:	<i>gnang bcar</i>

The Particle exemplified in all the Open Pieces in the last paragraph but one is *pa/ba(ga/nga/ra)* (Past), henceforth referred to simply as *pa*. It has already been classified as c/oP (p. 123). The Particle exemplified in the Close Pieces, on the other hand, *gi/gyi/kyi*, henceforth referred to simply as *gi*, is one of the minority of Particles that can be exemplified only in the Close Piece, whence they are termed Close-Piece (cP) Particles. This sub-category of Particle comprises six members: *gi*, *rtsis*, *dus*, *rgyu*, *mus*, *thabs*. These Particles are therefore sufficient to identify examples of the Closure Piece in Tibetan texts as Close; and the reader must treat them as such, whatever the Closure class of the Verb may be. It is significant that all six are written with one or other of the vowel letters *i* and *u*, and with *a* when immediately followed by *b* (but *i* and *u* in a Particle Syllable are not of themselves sufficient to identify a Piece in a text as Close: the c/oP Particles listed in section (ii) on p. 123 are also spelt with these letters).

There are certain c/oP Verb Syllables, *phebs*, *bstan*, and *ster*, for example, whose V terms do not have alternative exponents in the Close and the Open Piece (except for the fast-tempo alternative forms **tɛɛr-** and **chɛr-** to the **tɛ:bə-** and **chɛ:bə-** of *ster-ba(ra)-red* 'he gave' and *khyer-ba(ra)-red* 'he carried' respectively, which give an alternation ɛ/e), e.g.

<i>phebs</i>	{	oP	<i>phebs-pa-red</i> (phe:bə-)	he came	} e:
		cP	<i>phebs-kyi-'dug</i> (phe:ɡɪ-)	he is coming	
<i>ster</i>	{	oP	<i>ster-ba(ra)-red</i> (tɛ:bə-/tɛɛr-)	he gave	} e:
		cP	<i>ster-gyi-red</i> (tɛ:ɡə-)	he will give	
<i>bstan</i>	{	oP	<i>bstan-pa-red</i> (tɛmbə-)	he showed	} ɛ
		cP	<i>bstan-gyi-red</i> (tɛŋɡə-)	he will show	

In spite of the fact that in this respect *phebs*, *ster*, *bstan*, and other Verbs like them, differ from the majority of c/oP Verbs, there is no doubt that they are c/oP: the degree of vowel closure of the V term of the Particle Syllables *pas* and *rog* in **phe:bɛ:**, *phebs-pas*, **tɛɛ:**, *ster-ras*, and **tɛ:ɔ:**, *bstan-rog*, half-open (ɛ ɔ), proves it.

The c/oP Verbs are too numerous for listing, unlike the c/oP Particles (p. 123); but the orthography provides a fairly reliable means of identifying them: they are regularly written with the vowel letters *e* and *o*, and with *a* when not immediately followed by *b*, the same orthographic features as, with certain exceptions, distinguish the c/oP from the cP Particles.

The c/oP Verb Syllables that do not have alternative exponents of their V terms are regularly symbolized (i) by *e* immediately followed by either *b*, *d*, or *s*, or by *r* or *l*, except that examples of this last type have a fast-tempo alternative form, mentioned above, e.g. **te:re-**, cf. **te:bə-**, *ster-ba(ra)-red* 'he gave' (the resulting tempo alternation ϵ/e is not to be confused with the Closure alternation): *sleb* 'arrive', *phebs* 'come', 'gyel' 'fall', 'phel' 'spread', *rjed* 'forget', *brjes* 'change', *bzhed* 'fear', *ster* 'give', and possibly *bzhes* 'eat' and *khyer* 'carry'¹; and (ii) by *a* immediately followed by *n*: *bstan* 'show', *man* (a phonetic spelling; cf. *min*) 'am not', *phan* 'profit by', *dran* 'recollect', *nyan* 'listen to', *san* 'listen to'. The only exception to be noted from R. is *skyed* 'give birth to, create', for which he would accept **ci:gu-** as an alternative to **ce:gu-** in, for example, *skyed-kyi-'dug* 'they create', with the result that for the V term of this Verb Syllable, a cP exponent (i), in *skyed-kyi-'dug*, alternates with an oP exponent (e), in, for example, *skyed-pa-red* (**ce:bə-**) 'they created'.

Another Lhasa-dialect-speaker, Paljor Phuntshok (*dpal-'byor phun-tshogs*) (P.), a nobleman of the Tsarong (*tsha-rong*) family, would accept the form **ci:gu-**, but not **ce:gu-**. Further, since the form **phi:gu-** was heard from other Lhasa-dialect-speakers for R.'s **phe:gu-** (*phebs-kyi-'dug*), for them some at least of the Verb Syllables listed in the previous paragraph as having V terms with a single exponent have alternative exponents. Possibly the orthography had something to do with R.'s insistence on regarding these Verb Syllables as having the same exponent for the V term in Open Piece and Close Piece alike; for he gave the orthography as his reason for avoiding certain pronunciations that he agreed were current in the dialect. Thus, once they had been pointed out to him, R. readily accepted the alternatives $\alpha:/\alpha:$, **a/Δ**, and $\alpha:/\Delta$ as his own usage; for there is no orthographic means of symbolizing the latter alternative of each pair independently of the former; but he was reluctant to accept the alternative exponents θ/y , $\theta:/y:$, ϵ/ι , α/ω , and, at first, $\epsilon:/e$ too; for the latter member of each of these can be symbolized differently from the former, by *u* as opposed to *o* for $\theta(:)/y(:)$, α/ω , and ν/ω , by *i* as opposed to *e* for ϵ/ι , and by *e* as opposed to *a* for $\epsilon:/e$; and to use the closer degree of vowel closure in the Close Piece would, he insisted, result in orthographic and lexical confusion. R. said that it was for this reason that he made a point of avoiding such forms as **thonggy-**, *mithong-gi-'dug* 'he sees', **synggy-**, *zhon-gyi-'dug* 'he mounts', and **tyy:gy-**, *phrod-kyi-'dug* 'he delivers', which he agreed were to be heard from other speakers of the Lhasa dialect, in favour of **thonggi-**, **songgi-**, and **tjə:gi-**, respectively; for the form **thonggy-**, for example, might be confused with the **thonggy-** of *'thung-gi-'dug* 'he drinks'.²

For *phye-gi-'dug* 'he opens', *rtse-gi-'dug* 'he plays', and *len-gyi-'dug* 'he

¹ A phonetic form **εtgi-** has been noted for *bzhes* in addition to **ce:gi-**, *bzhes-kyi-yod-pas* 'do you drink'; the latter form is perhaps to be regarded as a spelling pronunciation. Alternative phonetic forms **chi:gi-**, *khyer-gyi-'dug*, and **churə-**, *khyer-ba(ra)-red*, have also been noted that would require *khyer* to be classed as cP (p. 128).

² P. not only pronounced *mithong-gi-'dug* 'he sees', **thonggydu:**, but insisted that it and *'thung-gi-'dug* 'he drinks' were homophonous.

takes ' , on the other hand, in each of which the Verb Syllable is spelt with *e*, R. would accept **təhɨgɨ-** and **təhɛgɨ-**, **tsɨgɨ-** and **tseɨgɨ-**, and **lɨngɨ-** and **lɛngɨ-**, as free variants; for *gon-gyi-'dug* 'he wears', he considered **khɨngɨ-** to be appropriate to informal, and **khəngɨ-** to formal, occasions.

R.'s usage, however, as reflected in both scripted and unscripted recordings, does not always support his preferences. The following phonetic forms, for example, to which he preferred **khəgɨ-**, **thəngɨ-**, and **tshəgɨ-**, are taken from recordings, in which his pronunciation is necessarily less self-conscious than in examples that he volunteered after some reflection :

<i>ha go-gi-med</i> (khəgə-)	I do not understand
<i>du-ba thon-gyi-'dug</i> (thɨngɨ-)	smoke will come out ¹
<i>kha zhed-drags skom-gyi-'dug</i> (kəmgɨ-)	I am very thirsty ²
<i>gsol-ja mchod-kyi-yin</i> (tshɨgɨ-)	we will drink tea

Although R. believed that he did not distinguish cP and oP exponents for the V terms of *go*, *thon*, *skom*, and *mchod*, he was prepared to accept alternative exponents as his own usage for the V term of the Verb Syllables 'gro and *yong*, e.g. 'gro-gi-'dug (**ɗrəgɨ-**) 'he is going', 'gro-ba-red (**ɗrəbə-**) 'they are in the habit of going' (ə/ɔ); *yong-gi-yin* (**ɨəngə-**) 'I shall come', *yong-ba-red* (**ɨənbə-**) 'he came' (ə/ɒ). Since both of these Verbs are frequently exemplified in the material, it is possible that frequency of use has something to do with whether or not R. was willing to accept alternative exponents for the V term of some Verb Syllables.

Thus far in this section attention has been focused on the Verb Syllable and alternations in the exponency of its V term; for it is this alternation in the degree of vowel closure characterizing certain Verb Syllables and the Particle Syllables *pas*, *a*, *rog*, etc., that sets the phonological problem that the Closure system is designed to solve; but the exponents of the Close and Open terms of the Closure system are not, of course, drawn from only one Syllable of the Piece but from both at once. There is, however, a good reason for leaving the stating of these exponents until this point: the exponents of the Close and Open terms are most easily stated for Pieces in which the Particle Syllable is either *pas* or *rog*; for the degrees of closure in either Syllable are different in each type of Piece, and there is no overlap:

	First Syllable	Second Syllable
Close	i ɨ y u ə ʔ	e o
Open	e ø ɛ ɔ ɒ a ʌ	ɛ ɔ

Pieces of that type provide the simplest introduction to the problem; but in Pieces in which the Particle Syllable is a Syllable other than *pas* or *rog*, it is possible for the same degree of vowel closure to characterize the first Syllable, and, more commonly, the second Syllable, of Open and Close Piece alike. There is then an overlap of phonetic feature as between the Close and the Open Piece; and the stating of exponents becomes more complicated:

¹ Gould and Richardson, *Sentences*, 97.

² *ibid.*, 69.

the vocalic features **e:** and **ɛ** can characterize the first Syllable of both, as in the examples of *phebs*, *ster*, and *bstan* (p. 125); and **ə**, **ɪ**, and **ɔ** can characterize the second Syllable of both, e.g.

ə	{	oP <i>ga-bar slab-pa gnang-ba-yin-na</i> where did you learn
		(naŋbə -)
ɪ	{	cP <i>phyag-las su'i rtsa-la gnang-gi-yod-na</i> whose place are you working
		(naŋgə -) at
ɔ	{	oP <i>khang tshar-ni (tsha:ɪ)</i> ¹ having finished filling
		cP <i>tshar-gyi-'dug (tsha:ɣɪ)</i> he is finishing
ə	{	oP <i>phyag-las ga-re gnang-dgos-red</i> what work do you have to do ²
		(naŋgə -) for setting up
ɔ	{	cP <i>bsgrigs-pa gnang-rgyu (naŋgɔ)</i>

The sum total of the exponents of Close and Open are, for Pieces in which the Verb Syllable is c/oP (for the remainder, see p. 133):

First Syllable	Second Syllable	
<i>Close</i>		
closeness (i: ɪ y(:) ɔ) ³	} closeness (i: ɪ y: ɔ)	
half-closeness (e: ɔ: [ø(:)]) ⁴		
half-openness + backness + spreading (ʌ(:))		
half-openness + frontness + spreading + short duration (ɛ)		
half-openness + frontness + spreading + nasality (ɛ̃:)		
[half-openness + rounding + short duration (ɔ)]		
[half-openness + rounding + nasality (ɔ̃:)]		
[openness + rounding (ɔ)]	half-closeness + backness + spreading (ɤ)	
	medium centrality (ə)	
<i>Open</i>		
half-closeness (e: ø(:))	} closeness (ɪ u ɔ)	
half-openness (ɛ(:) ɔ(:))		
openness (a a: ɔ)		
		half-closeness + frontness (e ø)
		half-openness (ɛ(:) ɔ(:))
	openness (a: a)	
	medium centrality (ə)	
	open ,, (ɤ) ⁵	

¹ Fast-tempo alternative to **tsha:ɪɛ**, *tshar-nas*.

² Bell, *Grammar*, 174.

³ **ci:ɣɪ** (*bskyed-kyi-'dug*) provides the only example of **i** (p. 126).

⁴ Features thought to have been influenced by the orthography (pp. 126-7) are enclosed in square brackets throughout.

⁵ Except for *a-yod* (**ʔajø**), *a-yong* (**ʔajõ**, **ʔajō**), *ma-red* (**maɪe**), *mi-yong* (**mejõ**), the first Syllable is also the Verb Syllable.

Some of the features given above are peculiar to either the Close or the Open Piece, and will therefore also serve as criteria of the appropriate term of the Closure system ; others are common to both. When characterizing the first Syllable, closeness (**i ɪ y ɔ**), half-closeness + backness + rounding (**o**), and half-openness + backness + spreading (**Δ**), are peculiar to the Close Piece ; while openness + frontness (**a**), and openness + backness + non-rounding (**ɑ**), on the other hand, together with half-openness, provided that it is further accompanied by long duration + non-nasality (**ɛ ɔ**) provide phonetic criteria of the Open term ; and so, probably, except in self-conscious utterances, do half-closeness + frontness + rounding (**ø(:)**), half-openness + rounding + either short duration (**o**), or long duration + nasality (**ɔ̃**), and openness + backness + rounding (**ɒ**). From the second Syllable, closeness + frontness (**i: y:**) and half-closeness + backness + spreading (**ɤ**) provide Close criteria (these features are also exponents of particular V terms of cP Particle Syllables, p. 125), e.g.

<i>bzo-rtsis (sɔdzi:) ra-po yod</i>	I am sort of about to make
<i>bzhugs-gdan 'jag-mus (dzɔ:my:) yin-pa-no</i>	is he in residence
<i>'di byed-thabs (tehdɤp) yod-ba [sic]</i>	there is no help for it ¹
<i>-ma-red</i>	

These three examples also provide phonetic criteria of the Close term from the first Syllable (**o Δ ɪ**).

It might appear that those features of the second Syllable which both serve as exponents of the Open term and are not shared with the Close term, half-closeness + frontness (**e ø**), half-openness (**ɛ ɔ**), openness (**a ɑ**), and open centrality (**ɶ**), must necessarily also provide oP criteria ; but this is not so ; for half-openness (**ɛ ɔ**), openness (**a ɑ**), and open centrality (**ɶ**) can equally well characterize the second Syllable of the Close Piece (i.e. the Close Piece in which the Verb Syllable is Close-Piece). In other words these features can also be exponents of the V terms of c/oP Particle Syllables (p. 123), each of which can, by definition, be contained in either the Close or the Open Piece. The remaining second-Syllable feature, half-closeness (**e ø**), is, as it stands, too imprecise to be considered from the point of view of phonetic criteria ; but the more specific combination half-closeness + frontness + spreading + long duration (**e:**), which characterizes not a Particle Syllable but a Verb Syllable (p. 128, n. 5), e.g. *ma-red (ma:e)* 'it is not', is restricted to the Open Piece, and does, therefore, provide an oP criterion. Half-closeness + frontness + spreading/rounding + short duration (**e ø**), on the other hand, does not : (oP) *bgres-byas (dɛ:e:dze)* 'having mixed up' ; (cP) *zhus-byas (ɛy:ze)* 'having asked for' ; (cP) *bzhugs-yod (ɛu:qø)* 'she is alive' ; (oP) *bzhugs-gdan 'jag-yod-pas (dza:jø-)* 'is he at home'.

If, however, *dwogs* (or *rdog*) and *med(mad)* were found to have cP alternative exponents (**o e**) (p. 123, n. 2), as may well be the case, then half-openness (**ɛ ɔ**)

¹ Bell, *Grammar*, 134.

could after all be stated as an oP criterion, e.g. *yod-dwogs* (**jɔ̃ndɔ:**), *gnang-rog* (**nā:ɔ:**), *'byor-mad-pa-no* (**dzɔ:me:-**), *bsdad-pas* (**dɛ:be:**).

The fact that it is uncertain whether half-openness (**ɛ ɔ**) as a feature of the second Syllable can of itself be stated as an oP criterion is, of course, no obstacle to using the alternation in exponency of the V terms of *pas* (**ɛ e**) and *rog* (**ɔ o**) to determine whether a Closure Piece is Close or Open.

It is noteworthy that, as features of the second Syllable, closeness + backness + rounding (**u**), and closeness + some centrality (**ɪ ɔ**), do not, as one might perhaps have expected, provide cP criteria: these features can also characterize the second Syllable of the Open Piece, e.g.

<i>phebs tshar-'dug</i> (tsha:du), not * tsha:du	(the doctor) has already left ¹
<i>byas-bzhin</i> (tche:ɛ:), not * tche:ɛ:	therefore
<i>khang tshar-ni</i> (tsha:ni), not * tsha:ni	having finished filling
<i>klog-shig</i> (lo:ɛ), not * lo:ɛ	read it
<i>phyag-phebs gnang-byung</i> (nā:dzɔ̃), not * nā:dzɔ̃	good morning
<i>chibs-bsgyur gnang-song</i> (nā:sɔ̃), not * nā:sɔ̃	he went
<i>go-nyung</i> (khɔ̃nɔ̃), not * khɔ̃nɔ̃	I had heard
<i>bshad-go-red-se</i> (ɛ:ɣɔ-), not * ɛ:ɣɔ-	'you will have to explain'

The features so far cited as criteria have been drawn from a single Syllable, whether first or second; where, however, a feature can be common either to the first or to the second Syllable of Close and Open Piece alike, it becomes necessary at least to cite as criteria features drawn from the vowels of both Syllables, and in some instances consonantal features as well. Since half-closeness + frontness + spreading (**e:**), half-openness + frontness + short duration (**ɛ**), and half-openness + frontness + long duration + nasality (**ɛ̃:**), together with the features that are suspected of being due to the influence of the spelling, [half-openness + frontness + rounding (**ø(:)**)], [half-openness + rounding + short duration (**ɔ**)], [half-openness + rounding + long duration + nasality (**ɔ̃:**)], and [openness + rounding (**ɒ**)], are common to both Close and Open Piece as features of the first Syllable, it is essential to combine these with features of the second Syllable in order to secure criteria. Half-openness + frontness + nasality (**ɛ̃:**), and half-closeness + frontness + rounding + nasality (**ɔ̃:**), as features of the first Syllable, together with any of the second-Syllable vowels **ɪ**, **u**, **ɔ**, **e**, **ø**, **ɛ(:)**, **ɔ(:)**, **ɛ**, **a**, are oP criteria; e.g.

<i>par skyon-ni</i> (cɔ̃:ni)	having printed
<i>bstan-song</i> (tɛ̃:sɔ̃)	he showed
<i>min-na</i> (mɛ̃:nə)	if I am not

oP criteria are also provided by either of the first-Syllable vowels **e:** or **ɛ**,

¹ Gould and Richardson, *Sentences*, 51.

or the suspect vowels [ø(:)], [ɔ], and [ɒ], when combined with any of the second-Syllable vowels **u**, **e**, **ɛ(:)**, **ø**, **ə(:)**, **ɑ:**, and **a**, but not with **ɪ**, **ɑ**, or **ə** ; e.g.

<i>ga-nas phebs-pa</i> (phe:ba:)	where did you come from
<i>gsungs-'dug</i> (son̄du:)	they have said
<i>thag ra-po mchod-ma-song</i> (tchø:ma-)	they sort of did not decide

Where the second Syllable is characterized by the vowel features **ɪ**, **ɑ**, or **ə**, a combination of any one of these with one of the first-Syllable vowels just considered, **e:**, **ɛ**, [ø(:)], [ɔ], and [ɒ], cannot provide a cP or oP criterion except by including in the criterion features of the intervocalic consonant or consonants. The cP Particle Syllable *gi* is largely responsible for this complication ; for medium centrality (**ə**) can, under certain prosodic conditions, be an exponent of the V term of this Syllable ; and, since *gi* is confined to the Close Piece, medium centrality (**ə**) can by this means be part of the exponency of the Close term. For the V term of *gi*, **ə** alternates as an exponent with the vowels **ɪ** and **ɣ**. These three exponents can be related to features of the preceding Verb Syllable and the following Particle Syllable, if any, harmonizing not with vowel-closure features but with labial features. Roughly speaking, for a detailed account of this alternation is not relevant to Closure, lip-rounding is a feature of *gi* (**gɣ**) where it is also a feature of the Verb Syllable (**u ɑ o**) ; lip-spreading is a feature of *gi* (**gɪ**) where spreading + closeness (**i ɪ**) is a feature of the Verb Syllable ; medium centrality (**gə**) is a feature of *gi* where any other lip position (**e ɣ ʌ**) characterizes the Verb Syllable. Clearly a prosodic system can be set up to deal with the harmonizing labial features of these two Syllables, just as it can for the associated closure features of the Verb and the Particle Syllable of the Closure Piece ; but the relevance of these labial features to the Closure system is that in Closure Pieces in which the Syllable preceding the cP Particle Syllable *gi*, the Verb Syllable, is characterized by half-closeness + frontness + spreading (**e**) or by backness + spreading (**ɣ ʌ**), and the Syllable following *gi* by features other than closeness + backness (**u ɑ**), then *gi* is generally characterized by medium centrality (**ə**), a feature that also characterizes the c/oP Particle Syllables *pa*, *ta*, *sa*, and *na*, e.g.

cP Particle : *gi* (**gə**)

<i>lo ga-tshod rtse thad-kyi-yod-na</i> (the:gə-)	about how many years is it since . . .
<i>phyag-las su'i rtsa-la gnang-gi-yod-na</i> (naŋgə-)	whose place are you working at
<i>bslab-kyi-yin</i> (lɣβgəjɪ:)	I will learn ¹

c/oP Particle : *pa* (**bə**), *ta* (**də**), *sa* (**sə**), *na* (**nə**)

<i>lhas-sa rang-la bzhugs bzhugs-pa-yin-na</i> (su:bə-)	used you to live in Lhasa itself, or . . .
<i>chibs-pa thar-sa</i> (tha:sə) <i>med</i>	ponies cannot cross by it ²

¹ Gould and Richardson, *Sentences*, 67.

² Bell, *Grammar*, 154.

As a result, both Open and Close Piece may have identical vowel exponents in each Syllable : **e** — **ə**/ɿ, **ɛ** — **ə**/ɿ, [**ø** — **ɿ**], [**ɔ** — **ɿ**], [**ʋ** — **ɿ**] ; e.g.

e — ə	{	oP	<i>ster-ba(ra)-red</i> (te:bə-)	he gave
		cP	<i>ster-gyi-yin</i> (te:gə-)	I shall give
			<i>bsdad-kyi-yin</i> (de:gə-)	I shall stay
e — ɿ	{	oP	<i>phebs-ni</i> (phe:ni)	having come
		cP	<i>phebs-kyi-'dug</i> (phe:gi-)	he comes
ɛ — ə	{		oP	<i>bstan-pa-red</i> (təmbə-)
		cP	<i>bstan-gyi-yin</i> (tənggə-)	I shall know
[ø — ɿ]	{		oP	<i>skol-shig</i> (kø:ɛɿ)
		cP	<i>bskol-gyi-'dug</i> ([kø:gi-])	he boils

Intervocalic velarity must be specified in the cP criterion, and intervocalic non-velarity in the oP :

cP criteria

- (i) the vowels **e**/ɿ, velarity, the vowels **ə**/ɿ (**e:gə**, **e:gi**, [**ɛgə**], [**ɛgi**], **əngə**, **əngi**) ;
- (ii) the vowels [**ø**:] [**ɔ**] [**ʋ**], velarity, the vowel **ɿ** (**[ø:gi]**, [**ɔgi]**, [**ʋngi]**) ;

oP criteria

- (i) the vowels **e**/ɿ, non-velarity, the vowels **ə**/ɿ (**e:Və**, **e:Vɿ**, **ɛVə**, **ɛVɿ**)¹ ;
- (ii) the vowels [**ø**(:)]/[**ɔ**], non-velarity, the vowel **ɿ** (**[ø**(:)]**Vɿ**, [**ɔVɿ**]).²

Similarly, where the vowel of the first Syllable is **e**: or **ɛ**, or one of the controversial vowels [**ø**:], [**ɔ**], [**ɔ**], or [**ʋ**], and that of the second Syllable is **ə**, it is necessary to specify the intervocalic sequence of features velarity—semi-vowel (**gi**) for the cP criterion, and features other than this sequence for the oP ; e.g.

cP	{	<i>bstan-rgyu</i> (təngjo)	for showing
		<i>la thad-rgyu</i> (the:gjo) <i>red</i>	no, he has not gone yet
oP	{	<i>phebs-nyung-ngas</i> (phe:nə-)	did you ever come to
		<i>ga-re byed-dgos-red</i> (təhəgə-)	what is one to do

In the course of the preceding two sections (A, B) all the relevant Particle Syllables have been classified, prosodically, as either Close/Open-Piece (c/oP), and therefore containable in both the Open and the Close Piece, or Close-Piece (cP), and therefore containable only in the Close Piece ; and some Verb Syllables have been classified as Close/Open-Piece (c/oP), and therefore containable in both the Open and the Close Piece. It now remains only to give an account of those Verbs which have not been classified as Close/Open-Piece.

C. Pieces containing Close-Piece (cP) Verb Syllables

The Particle Syllables *pas* and *rog* have already been used diagnostically, in section A, for classifying certain Verbs as Close/Open-Piece ; all the remaining Verbs that are exemplified in that section (in Pieces containing *pas* and *rog*), all of them in Close Pieces, are in fact confined to the Close Piece. These Verbs (*yin*, *gzigs*, *zhu/zhus*, *'dug*, *bzhugs*, *zin*, *dris*, *phul*, *blug*, *rgyab*,

¹ **V̄** symbolizes non-velarity.

² **V̄**ɿ is not preceded by **ɒ**.

slab), and others like them, are therefore termed Close-Piece (cP) Verbs. No cP Verb Syllable can have alternative exponents of its V term, one for the Close and one for the Open Piece, because it cannot be contained in the Open Piece.¹ In the following examples, all of them, of course, Close-Piece, the Particle category is exemplified by *pa*, which is c/oP, and by *gi*, which is cP, so that these examples of cP Verb Syllables may be directly compared with the examples of c/oP Verb Syllables (p. 134) :

<i>shi</i>	{ <i>shi-ba-red</i> (ɛɪbə-)	he died	} ɪ
	{ <i>shi-gi-'dug</i> (ɛɪgɪ-)	he dies	
<i>bris</i>	{ <i>bris-pa-red</i> (tɕi:bə-)	he wrote	} i
	{ <i>bris-kyi-'dug</i> (tɕi:gi-)	he writes	
<i>mthun</i>	{ <i>mthun-pa-red</i> (thymbə-)	it matched	} y
	{ <i>mthun-gyi-'dug</i> (thyŋgy-)	it matches	
<i>phul</i>	{ <i>phul-ba(ra)-red</i> (phy:bə-/phyɾ-)	he offered	} y
	{ <i>phul-gyi-'dug</i> (phy:gy-)	he offers	
<i>bskums</i>	{ <i>bskums-pa-red</i> (kɔmbə-)	he drew up	} ɔ
	{ <i>skum-gyi-'dug</i> (kɔmgy-)	he draws up	
<i>bzhugs</i>	{ <i>bzhugs-pa(ga)-red</i> (ɛu:bə-/ɛu:ɣə-)	he stayed	} u
	{ <i>bzhugs-kyi-'dug</i> (ɛu:gy-)	he stays	
<i>bslabs</i>	{ <i>bslabs-pa-red</i> (ɪɾbə-)	he learnt	} ɾ
	{ <i>bslabs-kyi-yin</i> (ɪɾbɣə-)	I shall learn	

The cP Verbs are, unlike the six cP Particles, too numerous to list ; but the orthography regularly indicates them by the vowel letters *i* and *u*, and by *ɔ* when immediately followed by *b* (cf. also the spelling of the cP Particle Syllables, p. 125), any of which orthographic features, when characterizing a Verb Syllable in a text, necessarily also indicates that where the Verb Syllable is contained in a Closure Piece, the Closure Piece must be Close, whatever the prosodic class of the following Particle Syllable may be.

The exponents of both the Close and the Open terms have been given for Pieces in which the Verb Syllable is c/oP (p. 128) ; the following exponents, which apply to Pieces in which the Verb Syllable is cP, should be added to those Close exponents :

	First Syllable	Second Syllable
<i>Close</i>		
	closeness (i ɪ y u ɔ)	} {
	half-closeness + backness + spreading (ɾ)	
	half-openness + backness + spreading (ɔ) ²	
		{ closeness (i ɪ y u ɔ) half-closeness (e o ɾ) half-openness (ɛ ɔ) openness (a ɔ) centrality (ə ɐ)

¹ The V terms of some cP Verb Syllables do have alternative exponents, but in relation to differences in tempo, e.g. (i) *bzhugs-pa(ga)-red* ; **ɛu:ɣɛɪ** (fast tempo), **ɛɔɣɛɪ** (slow tempo), **ɛu:bɛɪ** (common tempo) ; (ii) *bslɛɪ-ba(ra)-yin* : **tsi:bəjɪ** (common tempo), **tsɹɛjɪ** (fast tempo).

² These features refer to the Particle Syllable *a*, e.g. **ʔɔjɪ**. The first Syllable is a Particle Syllable in *a-yin*, *mi-'dug*.

Some of the above features, incidentally, provide criteria for the Close Piece over and above those given at p. 129. Closeness + backness (**u**), as a feature of the first Syllable, can be incorporated in the previously stated criterion, closeness (**i ɪ y ɔ**), to form a more comprehensive criterion : closeness (**i ɪ y u ɔ**); and half-closeness + backness + spreading (**ʋ**) can be merged with the previously stated criterion half-closeness + backness + rounding (**o**) to form a new criterion : half-closeness + backness (**o ʋ**). The second-Syllable combination of features half-closeness + backness + rounding can, similarly, be merged with half-closeness + backness + spreading to form the new criterion half-closeness + backness (**ʋ o**).

It is not essential for the Verb to be colligated within Word boundaries with the Particle category; monosyllabic Words in which the Verb alone is exemplified are both possible and common (p. 118). In Words such as these, Verb Words, the degree of closure of the V term of those c/oP Verb Syllables which have alternative exponents (pp. 124–5) is the same as that which is appropriate to the Open Piece (**e ø ε ə ɒ a u**), e.g.

<i>bod-skad rgyab</i> (ʒa:) <i>ma shes-na</i> , not * ʒa:	if they do not know how to speak Tibetan
<i>klog</i> (lo:) <i>thugs-pa</i> , not * lo:	being able to read
<i>so-so'i lung-pa'i phyu-pa gon</i> (kh̄θ:), not * kh̄ȳ:	wear one's own country's dress
<i>sa-skya khul-la'i cig chibs-bsgyur gnang</i> (nā:), not * nā:	he went to the Sakya area too

D. Conclusion

Two types of Piece are distinguished by this prosodic analysis of disyllabic forms grammatically classifiable as Verb + Particle : Close, and Open; both Verb Syllables and Particle Syllables are then classified, according as they can be contained in (i) both Close and Open Piece, or (ii) the Close Piece only, as (i) Close/Open-Piece (c/oP) Verb, and Particle, Syllables, or (ii) Close-Piece (cP) Verb, and Particle, Syllables.

One of the results of this analysis is that it becomes impossible to identify the Verbal Particle *gi/gyi/kyi* with the graphically similar Nominal Particle *gi/gyi/kyi/'i*, an identification that has probably had much to do with the attempts of some grammarians to incorporate what is in this article distinguished as the Verb category in the Noun.¹ The Verbal Particle *gi/gyi/kyi* is a Close-Piece Particle; the Nominal Particle *gi/gyi/kyi/'i* is not, e.g.

¹ Bell, *Grammar*, 43 : 'The Tibetan Verb . . . is in effect a Verbal Noun. Thus : *khos lug-sha za-gi-'dug* . . . HE IS EATING MUTTON, *lit.*, BY HIM, AS REGARDS MUTTON, AN EATING IS'. Herbert Bruce Hannah, *A grammar of the Tibetan language*, Calcutta, 1912, 239 : 'the so-called Tibetan Verb is rather a kind of Noun, modified in its signification by the Verb *to be*, according to the mood or tense of the latter'.

Even orthographically it is not possible to identify the Verbal Particle with the Nominal : the form of the Verbal Particle *gi/gyi/kyi* that follows a vowel letter is *gi*; but the form of the Nominal Particle *gi/gyi/kyi/'i* that follows a vowel letter is not *gi* but *'i*.

<i>sba-bu lags-kyis</i> (la:gu), not * la:gu	by Babu La ; cf.
<i>sba-bu lags-la</i> (la:lə)	to Babu La
<i>dbyin-ji'i skor-gyi</i> (ko:gu), not * ko:gu	about English ; cf.
<i>'di'i skor-la</i> (ko:lə)	about this
<i>bod-kyi</i> (phə:gu), not * phy:gu	of Tibet ; cf.
<i>bod-la</i> (phə:lə)	in Tibet

Setting up the Closure system is part of a conscious attempt to reconcile the categories required by analysis at the grammatical, lexical, phonological, and phonetic levels. The implications of this prosodic system for grammatical analysis have just been illustrated ; certain advantages are also claimed for it in phonological and lexical statement over, for example, a phonemic analysis.

Firstly, the close association of the two Syllables concerned, bound together by linking vowel-closure features, is given proper emphasis by treating these two Syllables as a unit, and by stating these closure features of both Syllables as an aspect of the whole unit, as an exponent of one or other term of the Closure system. In reading from a text, too, the Tibetan must take the second Syllable of the Closure Piece into account before he utters the first, just as, in intonation, he must be aware of the end of the Clause unit before he embarks on the beginning ; otherwise, he might mispronounce it.

Prosodic analysis also makes it possible to secure the considerable lexical advantage of associating the alternative degrees of vowel closure ϵ/ι , \mathfrak{o}/ω , \mathfrak{o}/y , $\mathfrak{o}/\mathfrak{o}$, ϵ/e , \mathfrak{v}/ω , \mathfrak{a}/Δ , and \mathfrak{a}/Δ , as exponents of the same V term under alternative prosodic conditions (in the Close or in the Open Piece).¹ A phonemicist would also, no doubt, be aware of the advantages to be gained from such an association of alternative features, and would try to associate them as allophones of the same phoneme. He would succeed, under certain conditions, in assigning the alternative vowel qualities $\mathfrak{o}/\mathfrak{o}$, \mathfrak{a}/Δ , and \mathfrak{a}/Δ each to the same phoneme (say / \mathfrak{o} /, / \mathfrak{a} /, and / \mathfrak{a} /). Thus, where the vowel of the following syllable had any of the features symbolized by \mathfrak{a} , \mathfrak{a} , \mathfrak{o} , ϵ , \mathfrak{v} , e , and u , the allophones of / \mathfrak{o} /, / \mathfrak{a} /, and / \mathfrak{a} / would be, respectively, \mathfrak{o} :, \mathfrak{a} , and \mathfrak{a} :, e.g. *lo:ja:*, *klog-ya(g)*, 'for reading', *nanga* (*phyag-las*) *gnang-ka*, 'in order to work', *tə:gere*, *bcag-pa(ga)-red*, 'he broke'; and where the vowel of the following syllable had the features symbolized by i , y , and \mathfrak{v} , their allophones would be, respectively, \mathfrak{o} :, Δ , and Δ :, e.g. *lo:dzi:*, *klog-rtsis*, 'about to read', *nandy:*, (*phyag-las*) *gnang-dus*, 'when you work', *bzhugs-gdan 'jag-mus*, (*dzə:my:*), 'in residence'.

This phonemic statement would run into difficulties where the vowel of the following syllable had the features symbolized by ι , \mathfrak{e} , and ω ; for ι and ω may follow either of the proposed allophones \mathfrak{o} and \mathfrak{o} , \mathfrak{a} and Δ , and \mathfrak{a} and Δ ; but this difficulty would not be insuperable : it could be disposed of by extending

¹ The analysis implied by Tibetan orthography is, incidentally, in agreement with the prosodic analysis in this respect (ϵ/ι is symbolized by *e*, \mathfrak{o}/ω , \mathfrak{o}/y , \mathfrak{v}/ω , and $\mathfrak{o}/\mathfrak{o}$ by *o*, and ϵ/e , \mathfrak{a}/Δ , and \mathfrak{a}/Δ by *a*), and therefore seems superior to the phonemic analysis of this material.

the environment of the allophones to include the intermediate consonant sounds. The allophones **o**, **ɒ**, and **ɑ:** would be appropriate to environments comprising the sequences **gɪ** and **gjo**, e.g. **lo:rgjo**, *klog-rgyu*, 'to be read', *phyag-las gnang-rgyu* (**naŋgjo**), 'work to be done', **lo:rgɪdu:**, *klog-gi-'dug*, 'he is reading', and the allophones **ɔ**, **a**, and **ɑ:** to environments comprising the sequences **dʒō**, **də-**, **sō**, **pō**, **jō**, **gə**, and **mɪ**, **nɪ**, **ɛɪ**, and **ɛɪ**; e.g. *phyag-las ga-re gnang-dgos-red* (**naŋgore**), 'what work do you do',¹ **lo:pəŋɛ:**, *klog-myong-ngas*, 'have you ever read', **tā:mundoge:**, *btang-mi-'dug-gas*, 'has it not been sent'; while the allophones **ɒ** and **ɑ:** would be appropriate to environments comprising the sequence **gə**, e.g. *dga-'gi-red*, **gəgəre:**, 'you would do well to', *bcar-gyi-yin*, **təa:gəjɪ:**, 'I will visit', and the allophones **a** and **ɑ:** to sequences comprising **bə**, **də**, **sə**, and **nə**, e.g. *phyag-las gnang-ba-red* (**naŋbəre**), 'he worked', *bcar-na*, **təa:nə**, 'if I visit'.

For the alternations **ɔ/o**, **a/ɒ**, and **ɑ:/ɑ:**, then, a phonemic analysis could achieve the same lexical aims as the prosodic analysis; but this phonemic analysis would fail to associate the remaining alternative vowels **ɛ/ɪ**, **ɔ/ə**, **ɒ/ɔ**, **ə/y**, and **ɛ/e** each as a pair of allophones of the same phoneme. The reason for this failure is that one of the members of each of the pairs is phonetically identical with a vowel sound that would be allotted to another phoneme; and that member would, therefore, also have to be allotted to that same phoneme: the alternative vowels **ɪ**, **ə**, **y**, and **e** of the pairs **ɛ/ɪ**, **ɔ/ə**, **ɒ/ɔ**, **ə/y**, and **ɛ/e**, e.g. **sugɪdu:**, *zer-gyi-'dug*, 'he says', **dɪogɪdu:**, *'gro-gi-'dug*, 'he is going', **təhy:ɪjə:bə:**, *mchod-kyi-yod-pa*, 'do you drink . . . or' (cf. the oP examples: **sebəre/seɪre**, *zer-ba(ra)-red*, 'he said'; **dɪəbəre**, *'gro-ba-red*, 'they are in the habit of going'; **təhə:bəre**, *mchod-pa-red*, 'they drank'), are phonetically identical with the vowels of *bzi*, *khrud*, and *phul*, as in *ra bzi-gi-'dug* (**sugɪdu:**), 'he gets drunk' (cf. the cP example *ra bzi-ba-red* (**subəre**), 'he got drunk'), **tɪogɪdu:**, *khrud-kyi-'dug* 'he washes' (cf. *khrud-pa* (**tɪəbə**) *gnang-na*, 'if he washes'), **phy:ɪjə:**, *phul-gyi-yod*, 'I offer' (cf. **phy:bəjɪ**, *phul-ba-yin*, 'I offered').² The vowel **ɪ** of *zer-gyi-'dug* (**sɪ-**) would then have to be allotted to the same phoneme (say /i/) as the vowel **ɪ** of *ra bzi-gi-'dug* (**sɪ-**), and separated from the vowel **ɛ** of *zer-ba-red* (**sɛ-**), which would be allotted to another phoneme (say /ɛ/); the vowels **ə** and **y** of *'gro-gi-'dug* (**dɪə-**) and *mchod-kyi-yod-pa* (**təhy:-**) would, similarly, be allotted to the same phonemes (say /u/ and /y/ respectively) as the vowels **ə** and **y** of *khrud-kyi-'dug* (**tɪə-**) and *phul-gyi-yod* (**phy:-**), and would be separated from the alternative vowels **ɔ** and **ə** of *'gro-ba-red* (**dɪə-**) and *mchod-pa-red* (**təhə:-**) respectively, which would be allotted (say) to phonemes /ɔ/ and /ə/. *zer*, *'gro*, and *mchod*, and other similar forms, would have to be treated, for purposes of lexical reference, as bi-phonemic: *zer*: /i/ and /ɛ/; *'gro*: /u/ and /ɔ/; *mchod*: /y/ and /ə/.

¹ Bell, *Grammar*, 174.

² On the inadmissibility in phonemic analysis of assigning successive occurrences of the same sound under the same phonetic conditions to different phonemes, see Bernard Bloch, 'Phonemic overlapping', *American Speech*, xvi, 278-84, and *Readings in linguistics*, Baltimore, 1957, 93-7.

This phonemic analysis would thus result in two different, and inconsistent, treatments of the same phonetic feature, vowel harmony: some pairs of alternative vowels would be assigned to the same phoneme, as allophones; other pairs would be split between two phonemes, an embarrassing contradiction that could only be disposed of by a complicated morpho-phonemic statement.

A third advantage of prosodic analysis is that it enables one to avoid the concept of assimilation, to which objections have been raised.¹ In this prosodic analysis each member of each of the pairs of alternative degrees of vowel closure, ϵ/ι , σ/ω , ν/\omicron , θ/γ , ϵ/ϵ , σ/σ , α/Δ , and α/Δ , is regarded as an equal exponent of the appropriate V term (I, E, O, etc.) under alternative prosodic conditions; there is no need to assume that one member of each pair is, somehow, basic, or a norm, and is replaced in some contexts (in which it is not merely unattested but unattestable) by the other non-normal member. On the contrary, one degree of closure is the appropriate exponent of the V term when contained in the Close Piece (its cP exponent) and the other is the appropriate exponent of that same V term when contained in the (complementary) Open Piece (its oP exponent); e.g. the V term of the Syllable 'then' (E) has closeness (ι) as an exponent in the Close Piece, and half-openness (ϵ) in the Open Piece. Each of these two exponents is attested in, and only in, the appropriate prosodic type of Piece; neither is ever an unattestable phantom. The norm concept is clearly inappropriate: each alternative would be the norm in its appropriate context; and there could never be a non-norm in that context.

There is a further obstacle in the way of applying the assimilation concept to the vowel-harmony material presented in this article. This concept would seem to require an assimilator and an assimilee. Thus, the vowel ϵ of the assimilee Syllable 'then' as in *tha-mag 'then-pa-red* (**thembə-**) 'he smoked', would be said to have been replaced in *tha-mag 'then-gyi-'dug* (**thungt-**) 'he smokes', by the vowel ι under the influence of the vowel ι of the following assimilator Syllable *gi*. In this example the assimilation relationship is of the type assimilee-assimilator. In, for example, *zin-pas, sumbe-*, 'did you catch', on the other hand, the relationship is of the type assimilator-assimilee: the vowel ϵ of the assimilee Syllable *pas* (as in *bsdad-pas, dɛ:bɛ-*, 'did you stay') would be said to have been replaced by the vowel ϵ under the influence of the vowel ι of the preceding assimilator Syllable *zin*. Difficulties arise when both Syllables of the assimilation are of the same assimilation type: assimilee-assimilee, e.g. *bsdad-pas, dɛ:bɛ-*, 'did you stay'; or assimilator-assimilator, e.g. *zin-gyi-red, sumgt-*, 'he will catch'. Where both Syllables are assimilators, which is assimilated to which?

The classification of Verb Syllables and Particle Syllables as either Close-Piece (cP) or Close/Open-Piece (c/oP) is purely distributional, and is based

¹ W. S. Allen, 'Some prosodic aspects of retroflexion and aspiration in Sanskrit', *BSOAS*, XIII, 4, 1951, 939.

on the possibility of being included in the Close, and the Open, Piece ; there is no attempt to assign to one Syllable responsibility for the degree of vowel closure of the other. On the contrary, the relevant features of both Syllables are treated as part of an exponent that applies to the disyllabic Piece as a whole. Features of the second Syllable of the Piece may be later on the time-track than features of the first ; but they are to such an extent integrated with them that both can best be treated as parts of a single articulation.