NGARDILPA (WARLPIRI) PHONOLOGY

(LANGUAGE OF THE WARNAYAKA TRIBE, A SUBTRIBE OF THE WARLPIRI TRIBE)

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0. INTRODUCTION

The purpose of this paper is to present a phonemic analysis of the Ngardilpa language spoken by the Warnayaka tribe, a subtribe of the Warlpiri tribe. This presentation includes the description of the phonemes, syllable and word structures, stress patterns, intonational features and morphophonemics.[1]

Prenasalised stops have been assigned phonemic status in the analysis presented in this paper. Differences between apico-alveolar and apico-domal consonants in word-initial position were difficult to ascertain. The discovery of the phone [e] in seeming contrast with other vowels made it hard to decide whether it should be a full phoneme or an allophone of one of the vowels. Analysis of stress led to the discovery that, while stress is phonologically contrastive, it is grammatically predictable because morphemes are inherently stressed.

1. PHONEME INVENTORY

Ngardilpa phonemes comprise twenty-three consonantal phonemes and six vowel phonemes: p, t, ʈ, tj, k, ᵐp, ⁿt, ᶯʈ, ⁿʲtj, ᵑk, m, n, ɳ, nj, ŋ, l, ɭ, lj, ɾ, ɻ, ʋ, w, y, ɪ, ɪ:, a, a:, u, u:.

1.1 *CONSONANTAL PHONEMES*

The inventory of twenty-three consonantal phonemes includes five stops, five pre-nasalised stops, five nasals, three laterals, two vibrants and three semi-consonants.

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1.1.1 Stops

The stops contrast at bilabial, apico-alveolar, apico-domal, lamino-alveolar, and dorso-velar points of articulation.

The bilabial stop /p/ has two allophones. One is the voiceless bilabial stop [p] which occurs in word-initial and intervocalic positions and as the second member in consonant clusters where the first member is not a nasal. The other one is the voiced bilabial stop [b] which occurs in word-initial position where it freely varies with its voiceless counterpart. It also occurs as the second member in consonant clusters where the first member is a heterorganic nasal.

The apico-alveolar stop /t/ has two allophones. One is the voiceless apico-alveolar stop [t] which occurs in intervocalic position and as the second member in a consonant cluster. The other one is the voiced apico-alveolar stop [d] which only occurs as the second member in a consonant cluster and in that position varies with its voiceless counterpart.

The apico-domal stop /ṭ/ has two allophones. One is the voiceless apico-domal stop [ṭ] which occurs in word-initial and intervocalic position and as the second member in a consonant cluster. The other one is the voiced apico-domal stop [ḍ] which only occurs as the second member in a consonant cluster and in that position freely varies with its voiceless counterpart.

The lamino-alveolar palatalised stop /tj/ has allophones ranging from a lightly articulated voiceless lamino-alveolar palatalised stop [tʃ] to a clearly discernible voiceless affricate [č]. These allophones occur in free variation in word-initial and intervocalic positions and as the second member in consonant clusters. However, the most frequently encountered allophone is the affricate [č] and it is considered to be the norm.

The dorso-velar stop /k/ has two allophones. One is the voiceless dorso-velar stop [k] which occurs in word-initial and intervocalic positions and as the second member in consonant clusters. The other one is the voiced dorso-velar stop [g] which occurs in word-initial position and as the second member in consonant clusters where the first member is not a nasal, varying freely in both positions with its voiceless counterpart.

All of the above stops are pronounced either with or without aspiration, even individual speakers are not consistent in this. However, it seems that non-aspirated pronunciation of the stops is the norm.

The following examples demonstrate how the various stops contrast in word-initial and intervocalic positions.

Word-initial contrasts:

/paři/	*'little boy'*
/ʈaɽi/	*'heel'*
/tjaři/	*'becomes'*
/kaři/	*'stands'*

Intervocalic contrasts:

/wapiřa/	*'father'*
/watiya/	*'tree'*
/waʈiɻi/	*'waist'*
/watjiii/	*'runs'*
/wakilpiři/	*'bush bean'*

1.1.2 Prenasalised Stops

Prenasalised stops comprise a voiced nasal followed by a homorganic voiced or voiceless stop.

In the earlier stages of analysis prenasalised stops were regarded as consonant clusters. They are now regarded as unit phonemes because the native speakers do not separate them into two separate segments word medially as the nasal closure of one syllable and the stop onset of the next. Extensive checking and psycholinguistic testing revealed that consonant clusters comprising nasal plus homorganic stop are, therefore, inseparable and function as a single phonemic unit. Discovery of one of the prenasalised stops in word-initial position strengthened the hypothesis since univalent CC clusters do not occur word-initially.

The prenasalised stops contrast at bilabial, apico-alveolar, apico-domal, lamino-alveolar, and dorso-velar points of articulation. They always occur syllable-initially.

The bilabial prenasalised stop /^{m}p/ has one allophone, the voiced bilabial prenasalised stop [^{m}b]. This stop is the only one in the prenasalised series that has been found to occur word-initially.[2]

The apico-alveolar prenasalised stop /^{n}t/ has two allophones. One is the apico-alveolar prenasalised stop [^{n}t] with voicing only on the nasal segment, and the other is the voiced apico-alveolar prenasalised stop [^{n}d]. Both of these allophones occur in free variation, but the voiced one seems to be the norm while the other one occurs more frequently in emphasised speech.

The apico-domal prenasalised stop /^{ɳ}ʈ/ has two allophones. One is the apico-domal prenasalised stop [^{ɳ}ʈ] with voicing only on the nasal segment, and the other is the voiced apico-domal prenasalised stop [^{ɳ}ɖ].

Again, both of these allophones occur in free variation, but the voiced one seems to be the norm while the other one occurs more frequently in emphasised speech.

The lamino-alveolar palatalised prenasalised stop /^{nJ}tj/ has a range of allophones beginning with a lamino-alveolar palatalised prenasalised stop [$^{\tilde{n}}$tj] and ending with a prenasalised affricate [$^{\tilde{n}}$č]. In this whole range the nasal segment is always voiced and occurs with varying degrees of palatalisation. These various allophones occur in free variation and those comprising the affricate occur more frequently and are considered to be the norm.

The dorso-velar prenasalised stop /^{ŋ}k/ has two allophones. One is the dorso-velar prenasalised stop [^{ŋ}k] with voicing only on the nasal segment, and the other is the voiced dorso-velar prenasalised stop [^{ŋ}g]. Both of these allophones occur in free variation, but the voiceless one occurs more frequently and seems to be the norm.

The following examples demonstrate how the prenasalised stops contrast intervocalically with nasals and stops:

/pama/	*'delicacy'*	/yama/	*'shade'*
/pa^{m}pa/	*'blind'*	/ya^{m}pi/	*'ceases'*
/papama/	*'call of emu'*	/yapa/	*'person'*
/waniki/	*'cross'*	/manu/	*'and'*
/wa^{n}ti/	*'falls'*	/ma^{n}ta/	*'grab!'*
/wati/	*'man'*	/mata/	*'tired'*
/waṇa/	*'snake'*	/ŋaṇuḷu/	*'they ate'*
/wa^{ɳ}ʈi/	*'stabbing spear'*	/wu^{ɳ}ʈuɽu/	*'far'*
/waʈiḷi/	*'waist'*	/puʈuḷu/	*'mid-back'*
/kanjiṇi/	*'brings'*		
/ku^{nJ}tjuɽu/	*'smoke'*		
/kutjuṇu/	*'threw'*		
/waŋu/	*'without'*	/yuŋu/	*'gave'*
/wa^{ŋ}ka/	*'speaks'*	/yu^{ŋ}ka/	*'give!'*
/waku/	*'arm'*	/yuka/	*'enters'*

1.1.3 Nasals

The nasals contrast at bilabial, apico-alveolar, apico-domal, lamino-alveolar, and velar points of articulation.

The voiced bilabial nasal /m/ and the voiced velar nasal /ŋ/ occur in word-initial and intervocalic positions and as the second member in

heterorganic consonant clusters.

The voiced apico-alveolar nasal /n/ only occurs intervocalically and as the first member in heterorganic consonant clusters.

The apico-domal nasal /ɳ/ has two allophones. One is the voiced apico-domal nasal [ɳ] which occurs in word-initial and intervocalic positions and as the first member in heterorganic consonant clusters. The other one is the voiced flapped apico-alveolar nasal [ɴ̆] which only occurs following the vowels /a/ or /u/, and it it the norm in this position even though it freely varies with the apico-domal allophone.

The voiced lamino-alveolar nasal /nj/ occurs in word-initial and intervocalic positions and as the first or second member in heterorganic consonant clusters.

The following examples demonstrate how the various nasals contrast in word-initial and intervocalic positions.

Word-initial contrasts:

/maɳa/	*'grass'*	/mu^{nj}tju/	*'blunt'*
/ɳama/	*'ant'*	/ɳuŋu/	*'flour'*
/njaŋu/	*'saw (verb)'*	/nju^{n}tu/	*'you (sing.)'*
/ŋama/	*'female'*	/ŋuɽ̆tju/	*'good'*
/miyi/	*'veg. food'*	/nja^{m}pula/	*'here'*
/njiya/	*'what?'*	/ŋa^{m}puɭa/	*'young girl'*
/ŋi^{n}ʈi/	*'tail'*		

Intervocalic contrasts:

/kamulu/	*'camel'*	/pimiɽi/	*'aunt'*
/kanu^{nj}tju/	*'low'*	/pina/	*'knowing'*
/kaɳuɽu/	*'sad'*	/piɳa/	*'tobacco'*
/kanjili/	*'they carry'*	/pinji/	*'hits'*
/kaŋulu/	*'they carried'*	/piŋi/	*'ant'*
/wanaɽ̆i/	*'leg'*	/ŋama/	*'female'*
/waɳa/	*'snake'*	/ŋana/	*'who?'*
/wanja/	*'emu feather'*	/ŋaɳa/	*'groin'*
/waŋaɭa/	*'crow'*		

1.1.4 Laterals

The laterals contrast at apico-alveolar, apico-domal, and lamino-alveolar points of articulation.

The voiced apico-alveolar lateral /l/ and the voiced lamino-alveolar lateral /lj/ only occur intervocalically and as the first member in heterorganic consonant clusters.

The apico-domal lateral /ɭ/ has two allophones. One is the voiced apico-domal lateral [ɭ] which occurs in word-initial and intervocalic positions and as the first member in heterorganic consonant clusters, and in a few instances in compounds as the second member in consonant clusters. The other is the voiced flapped apico-alveolar lateral [ɽ] which only occurs when preceded by the vowels /a/ or /u/, and is the norm in this position even though it freely varies with the apico-domal allophone.

The following examples show the occurrence of the lateral /ɭ/ in word initial position:

/ɭa^{m}paɽa/	*'father-in-law'*
/ɭu^{ŋ}kaɽa/	*'blue-tongue lizard'*
/ɭɪɽa/	*'mouth'*

Contrast between the various laterals in word-medial position is shown in these examples.

/malpa/	*'boomerang'*	/walu/	*'head'*
/maɭpa/	*'companion'*	/waɭu/	*'fire'*
/maljpakaɽa/	*'baby boy'*	/walja/	*'ground'*
/mulutja/	*'jealous'*	/pɪlɪ/	*'wooden scoop'*
/muɭuɻu/	*'white ant'*	/pɪɭɪ/	*'stone'*
/mulju/	*'nose'*	/mi^{ɳ}ʈɪlji/	*'lower back'*

1.1.5 Neutralisation between Apico-alveolar and Apico-domal Series

The contrast between the apico-alveolar series /t, n, l/ and the apico-domal series /ʈ, ɳ, ɭ/ is neutralised in word-initial position and in morpheme-initial position within compound constructions.[3] The apico-domal series is the norm in word-initial position, therefore symbols from that series are used word-initially in the examples throughout this paper.

/ʈimana/ [ʈɪmanɑ ~ tɪmanɑ]	*'horse'*
/ɳa^{n}tinjanji/ [ɳɑ^{n}tɪñɑñɪ ~ nɑ^{n}tɪñɑñɪ]	*'stares'*
/ɭa^{m}paɽa/ [ɭɑ^{m}pɑɽɑ ~ lɑ^{m}pɑɽɑ]	*'father-in-law'*
/ɽa:ljɭuwaɳi/ [ɽɑ:ljɭuwɑɳɪ ~ ɽɑ:ljluwɑɳɪ]	*'breaks limbs with weapon'*

The degree of retroflexion of the apico-domal series fluctuates in intervocalic position. Retroflexion is usually quite pronounced following the vowel /a/, not quite so pronounced following the vowel /u/, and somtimes almost imperceptible following the vowel /i/.

/waʈiɭi/ [wɑʈɪɭɪ ~ watɪlɪ]	*'waist'*
/muʈuɳa/ [mʊʈʊɳɑ ~ mʊtʊnɑ]	*'old woman'*
/miʈa/ [mɪʈɑ ~ mɪtɑ]	*'shield'*

/maṇa/ [mɑ̤ṇɑ̤ ~ mɑnɑ]	*'grass'*
/wuṇa/ [wṳṇɑ̤ ~ wunɑ]	*'trip'*
/ŋamiṇi/ [ŋɑmɪ̤ṇi̤ ~ ŋɑmɪni]	*'uncle'*
/maḷu/ [mɑ̤ḷṳ ~ mɑlu]	*'kangaroo'*
/wiḷḷiya/ [wɪ̤ḷḷiyɑ ~ wɪlliyɑ]	*'foot'*
/piḷḷi/ [pɪ̤ḷḷi̤ ~ pɪlli]	*'stone'*

1.1.6 Vibrants, Trills, and Apico-domals

Five phonetically distinct r sounds occur in Ngardilpa speech.

The voiced apico-alveolar vibrant /ř/ and its allophone, the voiced apico-alveolar trill [r̃], contrast in intervocalic position with the voiced apico-domal vibrant /ṛ̆/ and the voiced apico-domal semi-consonant /ṛ/ and its allophone, the voiced approximated resonant continuant [r].

/tjařa/	*'flame'*	/mařu/	*'house'*
/tjaṛ̆a/	*'sleep'*	/maṛ̆u/	*'water coolamon'*
/tjaṛa/	*'fat'*	/maṛu/	*'black'*
/kuřu/	*'dance site'*	/yiṛ̆i/	*'name'*
/kuṛ̆u/	*'child'*	/yiṛi/	*'point'*
/wiři/	*'watercourse'*	/wařaṛ̆a/	*'always'*
/wiṛi/	*'big'*	/waṛařa/	*'cliff'*
		/wawaṛ̆a/	*'covering'*

The vibrant /ř/ and its allophone, the trill [r̃], freely vary in intervocalic positions and as the first member in consonant clusters. The vibrant /ř/ seems to be the norm but the allophone [r̃] with varying length is invariably predictable in all cases where emphasis is applied to a word that contains a word-medial consonant cluster in which the first member is the vibrant /ř/.

	Normal	*Emphasised*	
/ŋuřtju/	[ŋuřtju]	[ŋur̃tju]	*'good'*
/yinařki/	[yinɑřki]	[yinɑr̃ki]	*'spider'*

The apico-domal vibrant /ṛ̆/ occurs in word-initial and intervocalic positions.

The semi-consonant /ṛ/ and its other allophone, the continuant [r], freely vary in word-initial and intervocalic positions and as the first member in consonant clusters. The continuant [r] seems to be the norm.

In word-initial position the contrast between the apico-alveolar vibrant /ř/ and the apico-domal vibrant /ṛ̆/ is neutralised in that they freely vary. However, the contrast between these neutralised vibrants and the semi-consonant /ṛ/ is maintained.

/řaᵑka/ or /r̥aᵑka/ *'take (it) out!'*
/r̥aᵐpaku/ *'light, fragile'*

/řaka/ or /r̥aka/ *'hand'*
/r̥a:kuřa/ *'towards flat country'*

/řukuřuku/ or /r̥ukuřuku/ *'chest'*
/r̥uřpa/ *'perforation'*

/řiyinpaᵑtini/ or /r̥iyinpaᵑtini/ *'joins by splicing'*
/r̥iyipinji/ *'smooths out'*

In the above, any examples with an initial /ř/ may be pronounced with either the allophone [r̃] or the /r̥/ allophone in that position. The apico-alveolar vibrant /ř/ is the norm in this word-initial position.

/řaka/ [řɑkɑ ∿ r̃ɑkɑ ∿ r̥ɑ̰kɑ] *'hand'*

Further, it has been observed that the allophones [ř] and [r̥] in word-initial position are frequently preceded by an [ə] onset.

/řayiřpa/ [ᵊřɑyiřpɑ ∿ ᵊr̥ɑ̰yiřpɑ] *'hard'*

1.1.7 Contrasts between Phonetically Similar Consonantal Segments

In this section contrasts are presented between consonantal segments which have not yet been compared with each other.

Apico-domal lateral /ɭ/ and apico-domal semi-consonant /ɻ/ in intervocalic position:

/maɭu/	*'kangaroo'*	/kaɭi/	*'boomerang'*
/maɻu/	*'black'*	/kaɻi/	*'other'*

Apico-domal lateral /ɭ/ and apico-alveolar vibrant /ř/ in word-initial and word-medial position:

/ɭuɭtju/	*'mound'*	/-kiɭi/	*'unique, only'*
/řutju/	*'woman'*	/kiři/	*'fluting'*

Apico-alveolar stop /t/ and apico-alveolar vibrant /ř/ in intervocalic position:

/puta/	*'tries'*	/mutu/	*'hitting stick'*
/puřa/	*'thirsty'*	/muřu/	*'scar'*

Apico-domal stop /ʈ/ and apico-alveolar vibrant /ř/ in intervocalic position:

/muʈu/	*'red ochre'*	/kaʈaku/	*'billy-can'*
/muřu/	*'scar'*	/kařawaɻi/	*'coolibah'*

Apico-domal stop /ʈ/ and apico-domal vibrant /ɽ̥/ in intervocalic position:

/miʈa/	*'shield'*	/kaʈiɽ̥i/	*'tooth'*
/miɽ̥i/	*'knee'*	/kaɽ̥iɽ̥i/	*'white'*

Apico-alveolar stop /t/ and apico-domal vibrant /ɽ̥/ in intervocalic position:

/mata/	*'tired'*	/puta/	*'tries'*
/maɽ̥a/	*'maybe'*	/puɽ̥a/	*'follows'*

Bilabial stop /p/ and bilabial semi-consonant /w/ in word-initial position:

/paniya/	*'eyes'*	/piɽ̥iya/	*'cold'*
/wanja/	*'emu feathers'*	/wiɽ̥iya/	*'young man'*

1.1.8 Semi-consonants

The voiced bilabial semi-consonant /w/ and the voiced alveo-palatal semi-consonant /y/ both occur in word-initial and intervocalic positions.

/waɽ̥i/	*'you don't say!'*	/ɻawa/	*'no, nothing'*
/wiɽ̥i/	*'watercourse'*	/tjiwiɽ̥i/	*'water'*
/wuɽ̥a/	*'wait'*	/yuwuɽ̥u/	*'big boy'*
/yani/	*'goes'*	/maya/	*'more'*
/yiɽ̥i/	*'point'*	/miyi/	*'food'*
/yuwa/	*'wow, amazing!'*	/kuyu/	*'meat'*

In deliberate, slow or emphasised speech the semi-consonant /w/ is perceived as merely a rounding of the lips with a slight degree of consonantal tenseness but it still acts as a distinct syllable boundary. In the phonemic sequences /awu/ or /uwu/ in deliberate speech the phoneme /w/ freely varies with the glottal stop[ʔ] .

/tjawutjawu/	[tjɑwutjɑwu ∿ tjɑʔutjɑʔu]	*'small intestines'*
/yuwuɽ̥u/	[yuwuɽ̥u ∿ yuʔuɽ̥u]	*'big boy'*
/ɲaⁿtuwu/	[ɲɑⁿtuwu ∿ ɲɑⁿtuʔu]	*'horse'*

In normal speech in the phonemic sequence /awu/ within a morpheme, the phoneme /w/ is perceived as the high close back vowel [u] offgliding from the preceding vowel. The vowel /u/ is elided.

/tjawutjawu/	[tjɑᵘtjɑᵘ]	*'small intestines'*
/ŋawu/	[ŋaᵘ]	*'bad'*

In normal speech in the phonemic sequence /uwu/ within a morpheme, the phoneme /w/ is perceived as either an offglide with accompanying

elision of the following vowel /u/, or as just a lengthening of the initial vowel /u/.

/yuwuřu/ [yʊᵘřu ∿ yu:řu] *'big boy'*
/ŋaⁿtuwu/ [ŋaⁿtʊᵘ ∿ ŋaⁿtu:] *'horse'*

When the phoneme /w/ occurs in the phoneme sequence /awa/ within a morpheme it is perceived as the high close back vowel [u] offgliding from the preceding vowel.

/ɭawa/ [ɭaᵘɑ] *'no, nothing'*
/palpawaŋu/ [palpaᵘɑŋu] *'star'*

In deliberate, slow or emphasised speech the phoneme /y/ is perceived as a voiced alveo-palatal semi-consonant with varying degrees of weak to strong articulation but still acts as a distinct syllable boundary. In such deliberate speech the phoneme /y/ in the phonemic sequences /ayi/ and /iyi/ freely varies with the glottal stop [ʔ].

/njuřuwiyi/ [ñʊřuwiyi ∿ ñʊřuwiʔi] *'long time ago'*
/miyi/ [miyi ∿ miʔi] *'food'*

In the phonemic sequences /yitj, yinj, yilj/ when word-initial, the phoneme /y/ is perceived either as a voiceless alveo-palatal semi-consonant [ʏ] or as a voiceless glottal fricative [h].

/yitjaǰu/ [ʏitjaǰu ∿ hitjaǰu] *'true'*
/yinja/ [ʏiña ∿ hiña] *'there'*
/yilja/ [ʏilja ∿ hilja] *'sends'*

In normal speech in the phoneme sequence /ayi/ within a morpheme, the phoneme /y/ is perceived as the high close front vowel [i] offgliding from the preceding vowel. The vowel /i/ of the sequence is elided.

/ŋalalayi/ [ŋalalaⁱ] *'too bad'*
/wayiṭi/ [wąⁱṭi] *'bush carrot'*

In normal speech in the phonemic sequence /iyi/ within a morpheme, the phoneme /y/ is perceived as just a lengthening of the initial vowel /i/.

/njuřuwiyi/ [ñʊřuwi:] *'long time ago'*
/miyi/ [mi:] *'food'*

1.2 *VOWEL PHONEMES*

The inventory of six vowel phonemes comprises the high front vowels

/ɪ/ and /i:/, the high back vowels /u/ and /u:/, and the low-central vowels /a/ and /a:/.[4]

1.2.1 Vowel Contrasts

The vowels /i/, /u/, and /a/ contrast as in the following examples:

/wiřɪ/	*'watercourse'*	/mɪɪjɪ/	*'loose dirt in goannas' burrow'*
/wuřa/	*'wait!'*	/muɪju/	*'nose'*
/wařɪ/	*'you don't say!'*	/maya/	*'more'*
/-kɪɻɪ/	*'unique, only'*	/pɪɻɪ/	*'stone'*
/-kuɻu/	*'with'*	/puɻa/	*'shouts'*
/kaɪa/	*'and'*	/paɪɪ/	*'dies'*

Contrast between a short vowel and its lengthened counterpart is demonstrated in the following examples:

/mɪmɪ/	*'forehead'*	/yanɪɪkɪ/	*'goes now'*
/mɪ:mɪ:njanjɪ/	*'scrutinises'*	/yuɳɪ:ɪka/	*'dirty'*
/kuɪkuɪmaɻa/	*'holds with lips'*	/ŋuřpa/	*'unknowing'*
/ku:ɪku:ɪpantɪɳɪ/	*'folds tightly'*	/ŋu:řpa/	*'larynx'*
/tjatjakaɽɪ/	*'other grandmother'*	/mařmařmanɪ/	*'weakens'*
/tja:tja:kařɪ/	*'opens and closes'*	/ma:řma:řmanɪ/	*'twinkles'*

1.2.2 Vowel Allophones

Both short and long vowels have strongly retroflexed allophones when contiguous to retroflexed consonants.

/-kɪɻɪ/ [kɻɻ]	*'unique, only'*
/pɪɻa:ɪɪ/ [pɻɻɑ:ɪɪ]	*'ritual friend'*
/muɪuɽu/ [mʊɪʊɽʊ]	*'large white ant'*
/yuɪʈu/ [yʊɪʈʊ]	*'hollow'*
/maɪpa/ [mɑɪpɑ]	*'companion'*
/waɪu/ [wɑɪʊ]	*'fire'*

The high front vowel /ɪ/ has three allophones. The high close front unrounded allophone [ɪ] occurs contiguous to the phoneme /y/, following palatalised consonants, and in word-final position.

/miyɪ/ [miyɪ]	*'food'*
/ɲjiya/ [ñiya]	*'what?'*

The voiced mid close front unrounded allophone [e] occurs only in word-final position when preceded by the phoneme sequences /uw/ or /u^{nj}tj/. Words comprising these sequences in word-final position are relatively rare.

/yuwi/ [yuwe]	*'yes'*
/kumu^{nj}tji/ [kumu$^{\tilde{n}}$tje]	*'nameless one'*

The high open front unrounded allophone [ɪ] occurs elsewhere.

/pikiři/ [pɪkɪřɪ]	*'woomera'*
/kiři/ [kɪři]	*'fluting'*

The high back vowel /u/ has three allophones. The high close back rounded allophone [u] occurs contiguous to the phoneme /w/, and in word-final position.

/njuřuwiyi/ [ñuřuwiyɪ]	*'long time ago'*
/yuwuřu/ [yuwuřu]	*'big boy'*

The high open back rounded allophone [ʊ] occurs elsewhere.

/kutu/ [kʊtu]	*'close'*
/kuyu/ [kʊyu]	*'meat'*

When the vowel /u/ is followed by the phoneme /nj/ some speakers pronounce it as a voiced high close front rounded vowel [ü] with an accompanying change in pronunciation of the phoneme /nj/ to that of the voiced apico-alveolar nasal /n/.

/kunjkunjŋaɳi/ [kʊñkʊñŋɑɳ̩ ∿ künkünŋɑɳ̩]	*'sucks'*
/muyunjku/ [mʊyʊñku ∿ mʊyünku]	*'bobs up and down'*

In reduplicated constructions the final vowel /i/ or /u/ of the initial group of syllables being reduplicated is pronounced as though it were in word-final position.

/kitikiti/ [kɪtikɪti]	*'armpit'*
/milpiɽipiɽi/ [mɪlpɪɽɪpɪɽɪ]	*'eyebrow'*
/ɭiŋiřtjiŋiřtji/ [ɭɪŋɪřtjiŋɪřtji]	*'immediate area around ears'*
/miɭikiɭpikiɭpi/ [mɪɭɪkɪɭpikɪɭpɪ]	*'shoulderblade'*
/řukuřuku/ [řʊkuřʊku]	*'chest'*
/tjapuɭupuɭu/ [tjɑpʊɭʊpʊɭʊ]	*'mouth'*
/tjalaŋutjalaŋu/ [tjɑlɑŋutjɑlɑŋu]	*'long time ago (20-40 years)'*
/pululu/ [pʊlʊlu]	*'(stand) still!'*

The low central vowel /a/ has three allophones. The voiced low close back rounded allophone [ɔ] only occurs when preceded by the semi-consonant /w/ and followed by a bilabial consonant. The voiced mid open central unrounded allophone [ʌ] occurs elsewhere except in word-final position, where only the voiced low open central unrounded allophone [ɑ] occurs. In interconsonantal position the allophone [ɑ] freely varies with the allophone [ʌ].

/wa^{m}pana/ [wɔ^{m}pʌnɑ ∿ wɔ^{m}pɑnɑ]	*'wallaby'*
/wapami/ [wɔpʌmi ∿ wɔpɑmi]	*'walks'*
/maljpakaňa/ [mʌljpʌkʌňɑ ∿ mɑljpɑkɑňɑ]	*'baby boy'*
/malpa/ [mʌlpɑ ∿ mɑlpɑ]	*'boomerang'*

All vowels in utterance-final position may be followed by a weakly articulated glottal stop.

2. PHONEME DISTRIBUTION

2.1 *CONSONANT DISTRIBUTION WITHIN THE PHONOLOGICAL WORD*

The phonological word in Ngardilpa is defined as a minimal utterance marked by primary stress and borders demarcated by features such as potential pause, pitch, and predictable occurrences of certain phonemes governed by phoneme distribution. Secondary stress is a further feature in words comprising three or more syllables.

All words begin with a consonant. Any single consonant except /t/, /^{n}t/, /^{n}ṭ/, /^{nj}tj/, /^{ŋ}k/, /n/, /l/, and /lj/ has been found to occur in word-initial position. See statement concerning /t, n, l/ in Section 1.1.5, and statement on /ň, ṇ̌/ in Section 1.1.6.

Neither single consonants nor consonant clusters occur in word-final position. However, in stems of compounds and reduplicated constructions consonants do occur in stem-final position of the non-final stem/s.

Any single consonant and certain consonant clusters may occur in word-medial position. Consonant clusters comprise only two consonants and may occur:

a) within morphemes and morpheme-initially;
b) within compound verbs at root boundaries[3];
c) within reduplicated constructions.

2.1.1 Category A, Consonant Clusters within Morphemes

Thus far, 25 different consonant clusters have been recorded within morphemes, three of these were in morpheme-initial position.

Homorganic Clusters

Lateral + stop:

/lt/	/kultu/	*'side, waist'*
/l̪t̪/	/yul̪t̪u/	*'hollow'*
/ljtj/	/yljtjlll/	*'fingernail'*

Heterorganic Clusters

Nasal + stop:

/np/	/tjaŋanpa/	*'opossum'*
/nk/	/klnkl/	*'devil'*
	/-nkul̪u/	*'you (2nd pers.pl.subj.suffix)'*
/n̪p/	/wln̪pa/	*'lightning'*
/n̪k/	/paŋ̪ku/	*'cousin'*
/njp/	/njlnjpa/	*'spits'*
/njk/	/muyunjku/	*'twitches'*

Nasal + nasal:

/nm/	/munma/	*'early'*
/nŋ/	/manŋlři/	*'lightning'*

Lateral + stop:

/lp/	/mllpa/	*'eye'*
	/-lpa/	*'used to (habitual tense aspect suffix)'*
/lk/	/yalklřl/	*'sky'*
	/-lku/	*'now (present tense aspect suffix)'*
/l̪p/	/mal̪pa/	*'companion'*
/l̪k/	/mul̪ku/	*'intestines'*
/ljp/	/maŋ̪aljpi/	*'sacred site, ceremony, or ground painting'*
/ljk/	/waljka/	*'cold'*

Lateral + semi-consonant:

/lw/	/kalwa/	*'egret'*
/l̪w/	/wal̪waŋ̪a/	*'tree lizard'*

Vibrant /ř/ + stop:

/řp/	/wlnlřpi/	*'corner of mouth'*
/řtj/	/ŋuřtju/	*'good'*
/řk/	/ylnařkl/	*'spider'*

Vibrant /ř/ + nasal:

/řm/	/yunkuřmu/	*'bush bean tree'*
/řɳ/	/ɳaɳpiřɳi/	*'curving to the left (of flight of boomerang)'*

Semi-consonant /ɾ/ + nasal:

/ɾɳ/	/ʈaɾɳa/	*'really'*

2.1.2 Category B, Consonant Clusters within Compound Verbs at Root Boundaries

Thus far, in this category 33 different consonant clusters have been recorded at the root boundaries of compound verbs.

Homorganic Clusters

Lateral + lateral:

/ll/	/wawuɭwawuɭɭuwaɳi/	*'tugs'*

Heterorganic Clusters

Nasal + stop:

/np/	/piřmanpinji/	*'rebounds, bounces'*
/ɳp/	/ɭakaɳpinji/	*'loosens, opens'*
/njp/	/řuřunjpinji/	*'removes'*
/ntj/	/panpantjaɳkami/	*'burns severely'*
/nk/	/ɳayinkitjiɳi/	*'breathes deeply'*
/ɳk/	/tjinaɳkitjiɳi/	*'stumbles'*

Nasal + nasal:

/ɳm/	/tjuɳtjuɳmani/	*'clicks'*
/njm/	/ʈunjmani/	*'groans'*
/njɳ/	/kunjkunjɳaɳi/	*'sucks'*

Nasal + semi-consonant:

/ɳw/	/ɳaⁿʈiɳaⁿʈiɳwapami/	*'walks stooped over'*

Lateral + stop:

/lp/	/piːⁿʈilpinji/	*'deals a crashing blow'*
/ɭp/	/tjuwuɭpinji/	*'jumps'*
/ɭk/	/tjuwuɭkaɾikaɾipinji/	*'it sunfishes'*
/ljp/	/wiljpinji/	*'beats up'*
/ljk/	/muljmuljkařkami/	*'leaves impression in ground'*

Lateral + nasal:

/ɭm/	/ʈa:ɭmani/	*'clicks, snaps'*
/ɭnj/	/miyiɭnjinami/	*'works while sitting'*
/ɭŋ/	/tjuɭjuɭŋunami/	*'floats in water'*

Lateral + lateral:

/ɭjɭ/	/řa:ɭjɭuwaɳi/	*'breaks limbs with weapon'*

Lateral + semi-consonant:

/ɭw/	/kapaɭkapaɭwapami/	*'staggers'*
/ɭw/	/tjuɭjuɭwapami/	*'walks through water'*
/ɭjw/	/kiwiɭjkiwiɭjwapami/	*'reels, staggers'*
/ɭjy/	/wuɽuɭjyani/	*'escapes'*

Vibrant /ř/ + stop:

/řp/	/řiɭjpiřpa^{n}tini/	*'punctures'*
/řtj/	/waɭkuřtjini/	*'barks at'*
/řk/	/waɽařwaɽařkitjiɳi/	*'rolls on ground'*

Vibrant /ř/ + nasal:

/řm/	/tjakuřmani/	*'lifts'*
/řŋ/	/kawuřŋaɳi/	*'crunches'*

Vibrant /ř/ + lateral:

/řɭ/	/ruŋkuřɭuwaɳi/	*'slices off with weapon'*

Vibrant /ř/ + semi-consonant:

/řw/	/wawuřwa^{ŋ}kami/	*'whirrs, makes a fluttering noise'*
/řy/	/řa^{nj}tjařyinji/	*'supplies, gives repeatedly'*

Semi-consonant /ɽ/ + stop:

/ɽk/	/yaɽyaɽkařimi/	*'rubs'*

2.1.3 Category C, Consonant Clusters within Reduplicated Constructions

Thus far, in this category 25 different consonant clusters have been recorded at the boundaries of reduplicated roots in compound verbs.

Homorganic Clusters

Lateral + stop:

/ɭʈ/	/ʈuɭʈuɭpatjiɳi/	*'slashes'*

Vibrant /ɾ/ + vibrant /ɾ/:

/ɾɾ/	/ɾuᵑkuɾɾuᵑkuɾpaⁿtini/	*'scrapes off'*

Heterorganic Clusters

Nasal + stop:

/np/	/panpantjaṇkami/	*'burns severely'*
/ṇp/	/paⁿʲtjaṇpaⁿʲtjaṇwapami/	*'leaves a trail'*
/ṇtj/	/tjuṇtjuṇmani/	*'clicks'*
/ṇk/	/kiᵑʈaṇkiᵑʈaṇwapami/	*'waddles'*
/njk/	/kunjkunjŋaṇi/	*'sucks'*

Nasal + semi-consonant:

/ṇy/	/yaⁿtaṇyaⁿtaṇwapami/	*'sneaks away quietly'*
/njw/	/winjwinjmani/	*'whistles quietly'*

Lateral + stop:

/lk/	/kapalkapalwapami/	*'staggers'*
/ḷp/	/plᵑʈaḷplᵑʈaḷpakaṇi/	*'plucks, flicks'*
/ḷtj/	/tjuwuḷtjuwuḷpinji/	*'bucks, hops'*
/ḷk/	/kuḷkuḷmaɻaṇi/	*'holds tightly between lips'*
/ljk/	/kiwiljkiwiljwapami/	*'reels, staggers'*

Lateral + nasal:

/ljm/	/muljmuljwapami/	*'walks leaving deep impressions'*
/ljŋ/	/ŋltiljŋiltiljpakaṇi/	*'cuts against the grain'*

Lateral + semi-consonant:

/ḷw/	/wawuḷwawuḷḷuwaṇi/	*'tugs'*

Vibrant /ɾ/ + stop:

/ɾp/	/paɾpaɾpaɻimi/	*'heats up'*
/ɾʈ/	/ʈultuɾʈultuɾpaⁿtini/	*'pecks'*
/ɾtj/	/tjitiɾtjitiɾwapami/	*'walks with head bowed down'*
/ɾk/	/kaliɾkaliɾkaɾkami/	*'spreads out, splits up'*

Vibrant /ɾ/ + nasal:

/ɾm/	/muɾmuɾŋaṇi/	*'chews noisily'*

Vibrant + semi-consonant:

/ɾw/	/waɻaɾwaɻaɾkitjiṇi/	*'rolls on ground'*
/ɾy/	/yawiɾyawiɾpatjiṇi/	*'cuts through in many places'*

Semi-consonant /ɾ̣/ + semi-consonant:

/ɾ̣y/ /yaɾ̣yaɾ̣kaɬimi/ *'rubs'*

2.1.4 Observations Concerning Consonant Clusters

The data collected thus far yielded 50 different consonant clusters, 11 of which occur in each of the three categories. The following chart facilitates comparisons of clusters in the three categories.

Category A	Category B	Category C
lt		
l̨t̨		l̨t̨
	l̨l̨	
ljtj		
	lj̨l̨	
		ɬɬ
np	np	np
n̨p	n̨p	n̨p
njp	njp	
	ntj	
		n̨tj
nk	nk	
n̨k	n̨k	n̨k
njk		njk
nm		
	n̨m	
nŋ		
	njm	
	njŋ	
	n̨w	
		n̨y
		njw
lp	lp	
lk		lk
l̨k	l̨k	l̨k
l̨p	l̨p	l̨p
		l̨tj
ljp	ljp	
ljk	ljk	ljk
	l̨m	
	l̨nj	

continued on next page

	ḷŋ	
lw	lw	
ḷw	ḷw	ḷw
		ljm
		ljŋ
	ljw	
	ljy	
ɻp	ɻp	ɻp
		ɻṭ
ɻtj	ɻtj	ɻtj
ɻk	ɻk	ɻk
ɻm	ɻm	ɻm
ɻŋ	ɻŋ	
	ɻḷ	
	ɻw	ɻw
	ɻy	ɻy
	ṛk	
ṛŋ		
		ṛy

Categories A and C share 3 consonant clusters, categories B and C share 2 consonant clusters, categories A and B share 6 consonant clusters, in addition to the 11 consonant clusters they all share in common. This leaves 5 consonant clusters that are unique to category A, 14 to category B, and 8 to category C.

The first member of a consonant cluster in any category is always either a nasal, a lateral, a vibrant, or in rare instances the semi-consonant /ṛ/.

The second member of a consonant cluster may never be the consonants /n/, /l/, /lj/, /ɻ/, and /ṛ/.

A total of only 6 homorganic consonant clusters were recorded, the remaining 44 are heterorganic.

2.2 *VOWEL DISTRIBUTION WITHIN THE PHONOLOGICAL WORD*

Vowels do not occur in word-initial position but all words end with a vowel. Vowel clusters do not occur. Long vowels never occur in word-final position.

The vowels /i/ and /u/ very rarely co-occur in contiguous syllables in words that do not comprise reduplicated or compounded constructions.

Vowel harmony normally occurs. Only a few exceptions have been recorded, as follows:

/kuřɪtjɪ/ *'shield'*
/kuɽɪtjɪ/ *'mother-in-law'*
/yukuɽɪ/ *'green'*
/kuɭɪřa/ *'south'*

3. SYLLABLES

Only two syllable types occur, CV and CVC.

CV type syllables:

/pi.na/ *'knowing'*
/ku.yu/ *'meat'*
/ma.ɭu/ *'kangaroo'*
/mɪ:.mɪ:.nja.njɪ/ *'scrutinises'*
/řu:.ka.ŋu/ *'pushed'*
/pi.ɭa:.lɪ/ *'ritual friend'*

CVC type syllables:

/kɪn.kɪ/ *'devil'*
/ŋuř.tju/ *'good'*
/ŋa.wuř.ŋa.wuř.pa/ *'hot'*
/lɪ:ɭ.kɪ/ *'staring'*
/mu:ɭ.pa.lu/ *'very careful'*
/ma:ř.ma:ř.ma.nɪ/ *'twinkles'*

Within a phonological word up to 11 CV syllables may occur consecutively.

/ma.lɪ.kɪ.tja.řa.ɭu.ka.pa.la.nja.nu yaɭ.kɪ.nɪ/ *'the two dogs are biting one another'*

But at the most only two contiguous CVC syllables occur in phonological words that do not comprise reduplicated constructions.

/řɪlj.pɪř.pa.^{n}tɪ.nɪ/ *'punctures'*
/waɭ.kuř.tjɪ.nɪ/ *'barks at'*
/ŋaɳ.pɪř.ŋɪ/ *'curving to the left'*
/pɪř.man.pɪ.njɪ/ *'rebounds'*

In reduplicated constructions, however, three or four contiguous CVC syllables may occur.

/pan.pan.tjaɳ.ka.mi/ *'burns severely'*
/ʈul.tuř.ʈul.tuř.pa.^{ɳ}ʈi.ni/ *'pecks'*

Some bound morphemes have the phonemic shape of CCV.

/-lku/ *(present tense aspect suffix)*
/-lpa/ *(habitual tense aspect suffix)*
/-npa/ *(2nd per.sing.subj.pronominal suffix)*
/-nkuɻu/ *(2nd pers.pl.subj.pronominal suffix)*

After suffixation the initial consonant of CCV suffixes fills the postnuclear margin of the final syllable of the morpheme to which it was suffixed.

/walj.ka.ka.ɳa/ *'I am feeling cool'* + /-lku/ *'now'*
/walj.ka.ka.ɳal.ku/ *'I am feeling cool now'*

Thus after suffixation the syllabic division of the consonant cluster of the suffixed morpheme no longer coincides with the lexical division.

4. WORD STRESS

Phonological words in Ngardilpa comprise one and up to fifteen syllables. Words comprising more than fifteen syllables have not yet been found in the data. Monosyllabic words and words comprising more than ten syllables are relatively rare.

The phonological word carries primary stress on the first syllable and secondary stress on specific syllables as explained below, but the final syllable is always unstressed. Primary stress is perceived as increased intensity or loudness, raised pitch, and sometimes length. Secondary stress is perceived as less loudness and less length than in primary stress, with pitch usually no higher than that of the contiguous, non-stressed syllables.

In this section, primary stress will be symbolised by /"/ preceding the syllable, and secondary stress by /'/ preceding the syllable.

In two- and three-syllable words no secondary stress occurs.

/"pi.na/ *'knowing'*
/"wa.ni.^{ɳ}ɲ$_{}$tja/ *'throat'*

Exception: A few two syllable words do not conform to the stress patterning as outlined above but they are extremely rare, e.g. /yu."wi/ *'yes'*.

In mono-morphemic words comprising four syllables, secondary stress occurs on the penultimate syllable.

/"mi.li.'tji.ʈi/ *'ceremonial armblood'*
/"kan.ka.'la.ř̆a/ *'up'*
/"ku.ʈu.'ř̆u.ř̆u/ *'heart'*
/"ŋal.minj.'minj.pa/ *'bat'*
/"ki.ti.'ki.ti/ *'armpit'*
/"ya.lju.'ya.lju/ *'red'*
/"nja.nja.'ki.ř̆i/ *'mistletoe'*

In mono-morphemic words comprising five and up to seven syllables, secondary stress occurs on the penultimate syllable. These are words that do not contain reduplicated syllables. Such words comprising more than seven syllables have not been found in the data.

/"tju.ř̆u.pulj.'pa.ř̆i/ *'full'*
/"pin.pi.ļi.'tjař̆.pa/ *'masked wood swallow'*
/"ka.na.ka.ļu.'^{m}pa.yi/ *'fat-tailed mouse'*
/"ka.ļa.ŋu.tja.ř̆a.'pa.^{ɳ}ʈa/ *'big scorpion'*

In mono-morphemic words containing reduplicated syllables and comprising five and up to eight syllables, secondary stress occurs, as follows:

(a) on the first syllable of each reduplicated group of syllables when these groups are preceded by two or more non-reduplicated syllables.

/"ŋi.^{ɳ}ʈi.'tjinj.'tjinj.ki/ *'rabbit bandicoot tail'*
/"tji.wi.'lji.ř̆i.'lji.ř̆i/ *'blue and white wren'*
/"kař̆.ka.la.'pa.yi.'pa.yi/ *'insect gall on coolibah'*
/"ka.ř̆a.tja.ļa.'pu.ɽu.'pu.ɽu/ *'bandicoot'*

(b) on the first syllable of the second group of reduplicated syllables when only one syllable, i.e. the word-initial primary stressed syllable, precedes the reduplicated group of syllables.

/"yu.ma.ɽi.'ma.ɽi/ *'gecko'*
/"ļi.ŋiř̆.tji.'ŋiř̆.tji/ *'temple (head)'*
/"pu.ř̆u.lju.'ř̆u.lju/ *'new leaves'*

(c) on the first syllable of each reduplicated group of syllables following one word-initial group of reduplicated syllables comprising two or more syllables.

/"ŋa.wuř̆.'ŋa.wuř̆.pa/ *'hot'*
/"ŋa.ļu.'ŋa.ļun.pa/ *'big red ant'*
/"ŋi.ř̆i.ɽi.'ŋi.ř̆i.ɽi/ *'round'*
/"ř̆u.ku.' ř̆u.ku.'ti.ɽi.'ti.ɽi/ *'small bird with red head'*

Mono-morphemic words containing reduplicated syllables and comprising more than eight syllables have not been found in the data.

In poly-morphemic words stress is determined by the inherent stress of each of the morphemes comrpsing such words.

Poly-syllabic morphemes comprising two and up to eight syllables are inherently stressed as explained above in the section dealing with mono-morphemic words.

Mono-syllabic morphemes other than verb roots have no inherent stress but they carry primary stress when they occur in word-initial position of poly-morphemic words, and secondary stress when they occur as the fourth syllable in a string of five inherently unstressed syllables.

The following examples of poly-morphemic words are marked only according to morphemes. Morpheme boundaries are marked by the symbol - . Verb roots are underlined. The symbols for primary and secondary stress remain unchanged.

/"pɪřman-'pɪ-nʤɪ/	*'rebounds'*
/"pař-pař-'paṛi-mi/	*'heats up'*
/"paṇka-tja-ḷɪ-'tjařa/	*'he and I ran'*
/"wɪlɪ^{ŋ}kiř-'paka-ṇɪ/	*'winks'*
/"ka^{ŋ}ʈa-'paṛu-'kaṛɪ-lɪ/	*'the other old women'*
/"ka-^{nj}tja-'ya-nu-lpa-'tjaṇa/	*'then, while carrying it, they went'*
/"najnuŋu-'njaŋu-'kuřa-tju/	*'he, towards himself, (is)'*
/"tjanjuŋu-nja-'ka-npa-'maṛa-ṇi/	*'do you have tobacco?'*
/"piṛa-'kuḷu-ḷu-lku-ka-'ma-ni/	*'he was then filling (it) up'*
/"puta-lku-'ṇalu-ḷa-'puṛa-'nja-ŋu/	*'we(excl.) now tried to think about (it)'*
/"wɪlpi-'ma-nu-řa-lpa-'pala-'yaṛa/	*'the two of them were pulling (it) away again'*
/"kula-'pina-lku-'nkulu-'yɪřkɪnpa-'ya-nu/	*'you all did not then return together'*
/"kulaṛa-'wɪyi-'njanu-ḷa-'tjuka-'tjuka-'yɪřa-ṇu/	*'repeatedly, he poked the spear at himself first'*

When a mono-syllabic morpheme occurs in word-initial position and is followed by a verb root, it carries primary stress while the first syllable of the verb root carries secondary stress.

/"pař-'paṛi-mi/	*'flies (verb)'*
/"řu:-'ka-ŋu/	*'pushed'*
/"řa:lj-'paka-ṇɪ/	*'fells a tree'*
/"pu:lj-'kɪtjɪ-ṇɪ/	*'removes from between the lips'*

When the exclamation or intensifier suffix /-wu/ is added to a word, the primary stress shifts from the first syllable to the penultimate syllable, and secondary stress, if any, is lost.

/"ya.^{m}pi.ya + wu > ya.^{m}pi."ya.wu/ *'stop it! (emphatic)'*
/"ḷa.wa + wu > ḷa."wa.wu/ *'no! (emphatic)'*
/"ya.ti.'tja.řa + wu > ya.ti.tja."řa.wu/
'north! (emphatic)'

5. INTONATION

Intonation in Ngardilpa is a complex phenomenon. Intonation is applied to phrases to affect their shade of meaning, but not their basic meaning. Sometimes intonation begins and ends at the borders of important grammatical units or of actual or potential phonological ones. Sometimes sequences of several intonation contours occur in series without pauses separating them. Speech tempo in conjunction with intonation is important also.

With intonational differences a speaker of Ngardilpa can express all sorts of mental states or feelings, such as satisfaction, discontent, disbelief, surprise, disappointment, contempt, hatred, pity, complacency, impatience, fear, doubt, pride, contentment, frustration, bellicosity, repugnancy, gaiety, etc.

Having said all that, it is significant to note that according to Hockett (1955), English intonations are built out of seven ultimate phonologic constituents, which occur only in certain arrangements relative to each other and relative to the remainder of the macrosegment. There are three pitch levels, three terminal contours, and one feature of the all-or-none type which is called "extra height". A macrosegment is defined as a stretch of speech or a short utterance with no internal pauses, and in English a macrosegment consists of two immediate constituents, namely, intonation and a remainder. There are in English less than a hundred different intonations and a transfinite number of different remainders.

Many alternative techniques for analysis of intonational systems have been and are being used by investigators, but thus far apparently no unified technique has as yet been developed. To date the intonational system of Ngardilpa has not been analysed beyond a preliminary investigation. This investigation revealed that some of the many possible intonation contours comprise the same types of elements found in some intonation contours of some of the other Western Desert Languages as well as English (this became apparent when reading Hockett).

No attempt will be made here to list or describe any of the many

types of intonation contours in Ngardilpa. A definitive description of the intonational system is presently beyond the scope of this paper because it has not yet been determined to what level within the phonological hierarchic structure this intonational system should be assigned.

6. MORPHOPHONEMICS

Most of the morphophonemic changes in Ngardilpa are governed by vowel assimilation or mutation. Vowel assimilation occurs between the vowels /ɪ/ and /u/, and the assimilation is either progressive or regressive. The remaining changes are due to the phenomenon that requires certain suffixes to begin with a prenasalised stop when affixed to disyllabic words, and with a lateral when affixed to poly-syllabic words.

The base form of a suffix or verb is the form displayed when the suffix in question is affixed to a noun ending with the vowel /a/, or the verb in question has a suffix affixed that is void of the elements that usually trigger regressive assimilation.

Some tense suffixes cause regressive assimilation on the vowels of the verbs to which they are affixed. The elements in tense suffixes that trigger such assimilation are the vowels /i/ and /u/, and the prenasalised stop /^{nJ}tj/ when it occurs suffix-initial.

/pu + -nji > pinji/	*'hits'*
/yu + -nji > yinji/	*'gives'*
/kɪtji + -ɲu > kutjuɲu/	*'threw'*
/tja^{ɳ}ʈi + -ɲu > tja^{ɳ}ʈuɲu/	*'scraped'*
/pu + -^{nJ}tja > pi^{nJ}tja/	*'keeps on hitting'*
/yu + -^{nJ}tja > yi^{nJ}tja/	*'keeps on giving'*

The final vowel of noun stems causes progressive assimilation of the vowel of the following suffix. The ergative suffix {-ɭu} has four allomorphs, -ɭu ∿ -ɭi ∿ -^{ŋ}ku ∿ -^{ŋ}kɪ. When the noun stem comprises three or more syllables the allomorph -ɭu follows stem-final vowels /a/ or /u/, and the suffix vowel assimilates following the vowel /ɪ/ to form the allomorph -ɭi. When the noun stem is disyllabic the allomorph -^{ŋ}ku follows stem-final vowels /a/ and /u/, and the suffix vowel assimilates following the vowel /i/ to form the allomorph -^{ŋ}kɪ.

/puluku/ + {-ɭu} > /pulukuɭu/	*'bullock'*
/malɪki/ + {-ɭu} > /malɪkiɭi/	*'dog'*
/waɭu/ + {-ɭu} > /waɭu^{ŋ}ku/	*'fire'*
/watɪ/ + {-ɭu} > /watɪ^{ŋ}kɪ/	*'man'*

Pronominal suffixes comprising the vowels /i/ and /u/ that are subject to progressive assimilation are as follows:

{-ɻi}	-ɻi ∿ -ɻu	*'you and I (subj.)'*
{-ɻitjařa}	-ɻitjařa ∿ -ɻutjařa	*'he and I (subj.)'*
{-ɻipa}	-ɻipa ∿ -ɻupa	*'you all and I (subj.)'*
{-nkuɻu}	-nkuɻu ∿ -nkiɻi	*'you all (subj.)'*
{-ɻu}	-ɻu ∿ -ɻi	*'they (subj.)'*
{-tju}	-tju ∿ -tji	*'I (obj.)'*
{-ᵑku}	-ᵑku ∿ -ᵑki	*'you (obj.)'*
{-ᵑkupaɪa}	-ᵑkupaɪa ∿ -ᵑkipaɪa	*'you two (obj.)'*

Various other suffixes that are also subject to progressive vowel assimilation are as follows:

{-kuřa}	-kuřa ∿ -kiřa	*'towards (allative)'*
{-ku}	-ku ∿ -ki	*'to (dative benefactive)'*
{-kuɪaŋu}	-kuɪaŋu ∿ -kiɪaŋu	*'of, belonging to (possessive)'*
{-kuɻu}	-kuɻu ∿ -kiɻi	*'with (instrument)'*
{-ɳi}	-ɳi ∿ -ɳu	*'moving hither (manner)'*
{-ŋuɻu}	-ŋuɻu ∿ -ŋiɻi	*'from (elative)'*
{-ɪku}	-ɪku ∿ -ɪki	*'now (present tense aspect)'*

Another suffix, the locative suffix {-ɪa} has two allomorphs, -ɪa ∿ -ᵑka. The allomorph -ɪa is suffixed to noun-stems comprising three or more syllables, and the allomorph -ᵑka to disyllabic noun-stems.

/yuwaɻi/ + {-ɪa} > /yuwaɻiɪa/	*'in the house'*
/waɪja/ + {-ɪa} > /waɪjaᵑka/	*'on the ground'*

One particular suffix, however, is immune to vowel assimilation:

/tjuŋa + {-kiɻi} > tjuŋakiɻi/	*'only the truth'*
/ŋanayi + {-kiɻi} > ŋanayikiɻi/	*'only what's his name'*
/yaɪuᵐpu + {-kiɻi} > yaɪuᵐpukiɻi/	*'only over there'*

APPENDIX

LEXICOSTATISTICAL WORD LISTS

The following 100-word list was supplied by Swadesh and modified by Samarin (1967:221).

1.	*I*	/ŋatju/
2.	*you (sing.)*	/nju^{n}tu/
3.	*we (incl.)*	/ŋalipa/
4.	*this*	/nja^{m}pu/
5.	*that*	/yali/
6.	*who?*	/ŋana/
7.	*what?*	/njiya/
8.	*not*	/l̻awa/
9.	*all*	/yuʈul̻upatu/
10.	*many*	/panu/
11.	*one*	/tji^{n}ta/
12.	*two*	/tjiɽama/
13.	*big*	/wiɻi/
14.	*long*	/kiɽiɻ̇i/
15.	*small*	/wita/
16.	*woman*	/ka^{n}:ʈa/
17.	*man*	/ŋaɽka/
18.	*person*	/yapa/
19.	*fish*	/yawu/
20.	*bird*	/tjul̻pu/
21.	*dog*	/tja^{n}:ʈu/
22.	*house*	/yuwal̻i/
23.	*tree*	/watiya/
24.	*seed*	/ŋul̻u/
25.	*leaf*	/tjaljuɽpa/
26.	*root*	/ŋa^{nj}tju/

27.	*bark*	/wuṟamiṟi/
28.	*skin*	/pi^{n}ti/
29.	*flesh*	/yilaṙa/
30.	*blood*	/yalju/
31.	*bone*	/yunkuṇu/
32.	*grease*	/tjaṛa/
33.	*egg*	/ŋipiṛi/
34.	*horn*	/malpi^{n}tiṙi/
35.	*tail*	/ŋi^{n}ṭi/
36.	*feather*	/pinkiṙpa/
37.	*hair*	/manilpa/
38.	*head*	/tjuṙu/
39.	*ear*	/ḷaŋa/
40.	*eye*	/milpa/
41.	*nose*	/mulju/
42.	*mouth*	/ḷiṙa/
43.	*tooth*	/kaṭiṟi/
44.	*tongue*	/tjalanpa/
45.	*fingernail*	/yiljtjiḷi/
46.	*foot*	/wiḷiya/
47.	*knee*	/miṟi/
48.	*hand*	/ṙaka/
49.	*belly*	/miyaḷu/
50.	*neck*	/kakaṙa/
51.	*breasts*	/ŋapulu/
52.	*heart*	/kuṭuṙuṙu/
53.	*liver*	/yilima/
54.	*drink*	/ŋaṇi/
55.	*eat*	/ŋaṇi/
56.	*bite*	/yalkini/
57.	*see*	/njanji/
58.	*hear*	/puṟanjanji/
59.	*know*	/pina/
60.	*sleep*	/tjaṟa/
61.	*die*	/puṙkatjaṙi/
62.	*kill*	/ḷi^{nj}tjaṙpa/
63.	*swim*	/tjuljulwa^{n}ti/
64.	*fly*	/paṙpaṟi/
65.	*walk*	/wapa/
66.	*come*	/yaniṇi/
67.	*lie*	/ŋuna/

68.	*sit*	/ɲjina/
69.	*stand*	/kaɽi/
70.	*give*	/yinji/
71.	*say*	/waᵑka/
72.	*sun*	/ŋiiipa/
73.	*moon*	/maɽiipi/
74.	*star*	/yaⁿʲtjiipiɻi/
75.	*water*	/ŋapa/
76.	*rain*	/ŋapa/
77.	*stone*	/pamaɽpa/
78.	*sand*	/waijaɽa/
79.	*earth*	/waija/
80.	*cloud*	/maᵑkuɻu/
81.	*smoke*	/yuijuɽu/
82.	*fire*	/waɭu/
83.	*ash*	/yuɭpiipa/
84.	*burn*	/tjaɳka/
85.	*path*	/yiɻiyi/
86.	*mountain*	/ŋanka/
87.	*red*	/yaijuyaiju/
88.	*green*	/yukuɻi/
89.	*yellow*	/kaⁿtawaɽa/
90.	*white*	/kaɻiɽi/
91.	*black*	/maɻu/
92.	*night*	/muŋa/
93.	*hot*	/ŋawuɽŋawuɽpa/
94.	*cold*	/piɽiya/
95.	*full*	/tjuɽupuijpaɻi/
96.	*new*	/ɲjuiuɽpa/
97.	*good*	/ŋuɽtju/
98.	*round*	/ŋiɽiɻiŋiɽiɻi/
99.	*dry*	/ɟiⁿʲtji/
100.	*name*	/yiɻi/

The following 100-item word list is O'Grady's List A and it is presented here to facilitate comparison with entries as listed in other Western Desert Language phonology papers also using O'Grady's List A.

a	1.	*head*	/tjuɽu/
	2.	*hair of head*	/wakuɭu/
	3.	*forehead*	/ŋaija,mimi/
	4.	*eye*	/miipa/

	5.	*nose*	/mulju/
	6.	*ear*	/ļaŋa/
	7.	*beard*	/tjaŋanka/
	8.	*mouth*	/ļiřa/
	9.	*tooth*	/kaţiři/
	10.	*tongue*	/tjalanjpa/
	11.	*throat*	/ŋu:řpa,wani^{nJ}tja/
	12.	*nape*	/kakařa/
	13.	*armpit*	/kitikiti,ŋakuljka/
	14.	*elbow*	/matiřitji/
	15.	*hand*	/řaka/
	16.	*fingernail*	/yiljtjiļi,miļtjanpa/
	17.	*chest*	/ŋa^{n}tuļuřu,řukuřuku/
	18.	*rib*	/ramařa/
	19.	*breast (woman's)*	/ŋapulu/
	20.	*heart*	/kuţuřuřu/
	21.	*liver*	/yilima/
	22.	*belly (external)*	/miyaļu/
	23.	*thigh*	/wanaři/
	24.	*knee*	/miři/
	25.	*foot*	/wiļiya/
	26.	*skin*	/pi^{n}ti/
	27.	*blood*	/yalju/
	28.	*fat, grease*	/tjaŗa/
	29.	*bone*	/yunkuŋu/
	30.	*name*	/yiři/
b	31.	*to see*	/nja-/
	32.	*to hear*	/puřanja-/
	33.	*to eat*	/ŋa-/
	34.	*to drink*	/ŋa-/
	35.	*saliva*	/njinjpa,yaya/
	36.	*to bite*	/yaļki-/
	37.	*urine*	/mawu/
	38.	*excrement*	/kuna/
	39.	*to cry, weep*	/yula-/
	40.	*to speak*	/wa^{ŋ}ka-/
	41.	*to smell it*	/pa^{ŋ}ţi-/
c	42.	*to be sitting*	/njina-/
	43.	*to be standing*	/kařa-/
	44.	*to be lying down*	/ŋuna-/
	45.	*to go, walk*	/ya-/
	46.	*to climb*	/wařka-/

	47.	*to fall*	/wa^{n}ti-/
d	48.	*to take it, grasp*	/ma-/
	49.	*to give*	/yu-/
e	50.	*to hit (with hand)*	/pu-/
	51.	*to cut it (meat)*	/patji-/
f	52.	*person, Aborigine*	/yapa/
	53.	*woman*	/ka^{n}ṭa,ɾutju/
	54.	*old man*	/tjaḷupaɻu/
h	55.	*a spear*	/kuḷaɻa/
i	56.	*fire*	/waḷu/
	57.	*(cold) ashes*	/yuḷpiḷpa/
	58.	*smoke*	/ku^{nj}tjuṛu/
	59.	*to be burning*	/tjaṇka-/
j	60.	*water*	/ŋapa,tjuwiṛi/
k	61.	*stone*	/pamaɻpa/
	62.	*ground, earth*	/waḷja/
l	63.	*sky*	/ŋuṛu/
	64.	*sun*	/wa^{n}ta,ŋiḷiḷpa/
	65.	*moon*	/maɻiḷpi/
	66.	*star*	/ya^{nj}tjiḷpiṛi/
m	67.	*by and by*	/ŋaka/
	68.	*now, today*	/tjaḷaŋu/
n	69.	*wind*	/mayawunpa/
o	70.	*north*	/yatiṭjaɻa/
	71.	*east*	/kakaɻaṛa/
	72.	*south*	/kuḷiɻa/
	73.	*west*	/kaḷaɻa/
	74.	*up*	/kankaḷaɻa/
	75.	*down*	/kani^{nj}tjaɻa/
p	76.	*far*	/wu^{n}tuṛu/
	77.	*big*	/wiṛi/
	78.	*small*	/wiṭa/
	79.	*long*	/kiɻiɻi/
	80.	*short*	/ṭaɻu/
q	81.	*meat*	/kuyu/
	82.	*rotten (meat)*	/puka/
	83.	*dog*	/tja^{n}ṭu,maḷiki/
	84.	*tail*	/ŋi^{n}ṭi/
	85.	*snake*	/waṇa/
	86.	*egg*	/ŋipiṛi/
	87.	*a fly*	/yimaŋi/
r	88.	*(vegetable) food*	/miyi/

	89.	*tree*	/watiya/
	90.	*leaf*	/tjaɪjuřpa/
s	91.	*one*	/tjiⁿta/
	92.	*two*	/tjiřama/
	93.	*many*	/panu/
t	94.	*I intr.*	/ŋatju/
	95.	*you (sing.) intr.*	/njuⁿtu/
	96.	*this*	/njaᵐpu/
	97.	*what?*	/njiya/
	98.	*where?*	/njařpaɽa/
	99.	*who?*	/ŋana/
v	100.	*black (as dog)*	/maɽu/

NOTES

1. Dr A. Capell (1963) lists Waljbiri (Wailbri) as a Western Desert Language along with Walmanba (Walmala), Ngardi and Wanajaga (Waneiga) as dialects, whereas O'Grady, Voegelin and Voegelin (1966:39) subordinated Western Desert Languages under the Wati Subgroup but Wailbri under the Ngarga Subgroup.

W.J. and L.F. Oates (1970) list Walmanba (Walmala), Walbiri (Elpira, Ilpara, Ilpira, Ilpirra, Waibry, Wailbri, Waljbiri, Walpari, Walpiri, Wolperi, Wolpirra), Ngardi, Wanayaga (Wanajaga, Woneiga), and Ngalia (Nambuda, Ngallia) in the Ngarga Subgroups of the South-west Group of the Pama-Nyungan Family.

The spelling of the names of the tribes and languages in the next four paragraphs conform to the phonemic representation used throughout this paper. In the title these names are spelled according to the practical orthography.

According to the members of the Waṉayaka subtribe residing at the Hooker Creek Aboriginal Settlement in the Northern Territory, the situation is as follows: Waḻpiṟi is the collective name for a people or tribe comprising four subtribes, namely, Waṙmaḻa, Waṉayaka, Ṉaṟi, and Ṉaliya. The Waṙmaḻa tribe speaks Waṙmaḻa, the Waṉayaka tribe speaks Ṉaṟilpa, the Ṉaṟi tribe Njinin, and the Ṉaliya tribe Ṉaliya. A high degree of mutual intelligibility seems to exist between speakers of Ṉaṟilpa and Waṙmaḻa, but exact percentages of intelligibility between these and other languages spoken by the subtribes will not be available until after a dialect intelligibility survey has been conducted.

The Ṉaliya tribe supposedly was the "original" and largest tribe, but today only a small number of them remains and many others have intermarried with members of the other subtribes.

In 1969 the Waḻpiṟi population, including the four subtribes, stood at 2520. This figure was supplied by the Northern Territory Administration, Welfare Branch Research Department.

At Hooker Creek the Waŋayaka subtribe is definitely in the majority; approximately 570 Waŋayaka reside there in contrast to about only 15-25 members of the Wařmaḻa subtribe. Greater numbers of Wařmaḻa are said to reside at Warrabri and Yuendumu Aboriginal Settlements in the Northern Territory. Additional members of the different subtribes of the Waḻpiɣi tribe live in varying numbers in other places in the Northern Territory (Papunya, Wave Hill and Bagot Aboriginal Settlements, Wave Hill Station, Alice Springs, Willowra Station, Coniston Station, Barrow Creek, Wauchope, Tennant Creek, Phillip Creek, Banka Banka, Renner Springs, Elliot, Newcastle Waters, Daly Waters, Katherine, Limbunya, Rosewood, Mistake Creek, Inverway, Birrindudu, Mt Doreen, Mt Dennison, Napperby, Mt Wedge, Mt Allan, and other cattle stations and towns not mentioned here), and in Western Australia (Gordon Downs, Nicholson, Flora Valley, Ord River, Billiluna, Halls Creek, Spring Creek, and Kununurra).

The data for this paper was collected during seven months in 1971 and checked over a further period of two years at Hooker Creek Settlement under the auspices of the Summer Institute of Linguistics, with the assistance of language informants, Jerry and Paddy Jangala. The author is indebted to Miss Velma Leeding and others of the Summer Institute of Linguistics for their helpful and constructive comments and criticisms on the analysis of some of the phonemes in this paper.

Thanks is also due to Dr Kenneth Hale of Massachusetts Institute of Technology for supplying his unpublished "Lessons in Walbiri", and to Miss Irene Marker and Mrs Marjorie (Hockaday) Marsh of the Summer Institute of Linguistics for access to their unpublished "Wailbri Phonology".

The description presented here is based on the phonological procedures and approach developed by Dr Kenneth L. Pike (1947).

2. According to speakers aged 40 and over, the prenasalised stop /^{m}p/ occurs word-initially only because the initial syllable has been elided many decades ago. Younger speakers are not even aware of this and say that these words have always had the prenasalised stop /^{m}p/ in word-initial position.

3. A compound verb stem comprises two roots. The second root is a finite verb. The first root is dependent and functions only in this position. The first root may be a reduplication of itself.

4. The co-existence of long vowels /u:/ and /i:/ and the sequences /uwu/ and /iyi/ was determined by counting the syllables in words in

deliberate speech. The long vowels did not become two syllable nuclei as did the sequences.

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