THE PHONOLOGY OF LOWER GRAND VALLEY DANI

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THE PHONOLOGY OF LOWER GRAND VALLEY DANI

A Comparative Structural Study of Skewed Phonemic Patterns

BY

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PREFACE

During four years of service as a missionary of the Christian and Missionary Alliance in the Baliem Valley area of central Netherlands New Guinea, the writer has had as a major responsibility the analysis of the language and the preparation of learning aids for his colleagues. Of necessity, work in an unadministered area by a party who were the first permanent western residents could not be completely specialized. Many hours were spent in preparation of housing and food and maintenance of equipment. More importantly, a great deal of time was invested in making friends with the local people and trying to understand their way of life. What periods were available for linguistic research were spent in rewarding, if at first slow, monolingual investigation. No second language was available for use as a questioning tool, and even the vocabulary lists from earlier explorers proved virtually valueless, so different was the dialect from those previously reported.

From that first term of study and work have come conversational fluency in the dialect primarily described in this thesis, a body of language lessons for other missionaries and the preliminary work for a technical description of the language, of which this thesis is the first instalment. It was earlier planned that the present study should comprise the first of three chapters of a complete report including grammar as well as phonology. When the non-congruence of phonemic patterns of related dialects appeared as a potentially valuable problem to which to devote fuller treatment, and a draft of the proposed second chapter promised to swell the total bulk of the report to unwieldy size for a single study, a suggestion was adopted to limit the thesis to the

phonology and to highlight the skewing of the phonemic pattern of the lower Grand Valley dialect in relation to other dialects.

Warm thanks are due the staff of the Summer Institute of Linguistics of the University of Oklahoma for training received in two summers of study and one of instruction there before beginning work in New Guinea. Dr. Robert F. Spencer has given appreciated guidance to a graduate study program in anthropology and linguistics at the University of Minnesota and has, as thesis adviser, offered important suggestions for the organization and limitation of the project. Dr. William A. Smalley of the American Bible Society and Gordon F. Larson, a missionary colleague of the author, have read earlier drafts of this description and given constructive criticism. From other missionaries on the field and now from his wife the author has received the very real contribution of interest, tolerance of his preoccupation with things linguistic, and assumption of much of his share of routine work. To G. Linwood Barney is owed a debt of appreciation for the not inconsiderable contribution of assembling and submitting the manuscript and attending to the final time-consuming details and travels involved. Particular acknowledgment is made of Apsalek, 'Man-surrounded,' whose intelligent responsiveness and almost inexhaustible patience guided the author into the knowledge of lower Grand Valley Dani. Many other friends joined him as helpful tutors in the school of life and talk together. To our Lord, in whose name this work has been done, thanks is given with a prayer that it may have speeded communication of the Good News of Christ to the Dani speaking peoples of central Netherlands New Guinea.

PREFACE TO THE PUBLISHED EDITION

Publication of this thesis has been made possible by a generous financial subsidy provided by the government of Netherlands New Guinea and the Koninklijk Instituut voor Taal-, Land- en Volkenkunde. Warm thanks are also due Dr. J. C. Anceaux of the Kantoor voor Bevolkingszaken, Hollandia, for the recommendation and active encouragement he has given.

In January, 1959, the writer returned to the Baliem Valley, and during two and a half years of further work in the area the general accuracy and validity of the analysis have been confirmed. The most significant new development was a conference in February, 1961, of Doctor Anceaux, representing the administration, Father van der Stap, representing the Roman Catholic mission, and the writer, representing the Protestant missions, to agree upon an orthography for Dani. At that time the recommendations presented in Chapter IV were adopted except that: (1) The symbols 'y' and 'v' were chosen for the high open vowels, instead of 'ɨ' and 'ʊ.' Ready availability on typewriters and distinctive shape are advantages offered by these symbols. The latter factor is significant in the light of the five vowel dialect now reported from the upper Hablifoeri area, in which /i/ and /u/ correspond to the high close vowels, and /e/ and /o/ correspond to both the high open vowels and the mid vowels of seven vowel systems. Readers from that area would only be confused by materials in a seven vowel dialect using similarly shaped symbols for what are for them contrasting phonemes and contrastively shaped symbols for what are for them allophones of single

phonemes. Reader response to the new symbols has been excellent. (2) The digraphs 'bp' and 'dl' were chosen for the implosive stops, instead of 'ɓ' and 'ɗ.' Note that no sequence of phonemes /bp/ or /dl/ occurs in any known dialect and that the second letter in each digraph is used in dialects which do not have implosive stops to represent the commonest correspondences of these phonemes. (3) The attempt to represent intonational contrasts fairly closely by use of two punctuation marks in sequence was abandoned. Periods were chosen to symbolize sentence terminal with downgliding intonation, question marks to symbolize upgliding intonation in questions, exclamation points to symbolize sentence terminal with intonation contours marking surprise by inclusion of level one, and commas to symbolize any sentence medial plus contour terminal.

CORRIGENDA

P. 1, next to the last line of text, and p. 8, sec. 2.2, line 3: **Tinak** is now commonly spelled Sinak.

P. 2, footnotes, line 1: this pronunciation was earlier reported in the literature, but Gordon F. Larson in a personal communication states that normally the Monis pronounce this name with an implosive [ɗ].

P. 3, footnote 7, line 3, and p. 10, sec. 2.3 heading, line 2, footnote 2: Wodo is now spelled Wodlo.

P. 12, last complete sentence: further check of upper Bele materials indicates that /s/ is there already a separate phoneme in contrast with /t/ in a limited number of cases, and this may prove true in BV also.

P. 14, last line: one uncommon case of initial velar nasal has now been recorded in LGV.

P. 18, line 2: for 'extant' read 'described.'

P. 21, footnote 2: for '3.1215' read '3.1214.'

P. 29, footnote 12: insert 'in nearly all cases' at the end of line 2.

P. 30, footnote 14, line 14: for '/luppuet/' read '/luppuwet/.'

P. 31, line 3: for '/β/' read ' */β/.'

P. 34, line 3: insert 'the allophones of' following the comma.

P. 37, next to last line of text: for '/huoŋ, huon/' read '/huwoŋ, huwon/.'

P. 38, line 5: for '/31+/' read '/el+/.'

P. 38, fourth line from bottom: for 'turn it over' read 'dump it out.'

P. 39, last paragraph, line 1: delete 'in all environments where it occurs' and add to this paragraph the following sentence: 'Before /i/, /j/ is represented by a voiced lamino-gingival allophone of lenis sibilant articulation [ʒ]: /ji/ [ʒi] 'syllable used in weeping.' '

P. 40, footnote 24, line 20: for '/ʊʊV/' read '/uwV/.'

P. 46, section 3.12221, line 4: after 'occurring' insert 'with a consonant following and this whole sequence.'

P. 46, footnote 34: add, 'One recorded unit /seei-tek/ [s3ii-r3k] 'prevaricating' contains the sequence /ei/ with full syllabicity for each vowel. This necessitates the preceding correction of section 3.12221.'

P. 51, footnote 45: add, 'Further check of the data indicates that in several of the examples given secondary stress is a freely varying

phenomenon, but a completely valid statement of predictability has yet to be made.

P. 54, line 7: after 'Glottal' insert 'stop.'

P. 56, line 12: after 'excitedly' insert closing parenthesis mark.

P. 57, line 3: after 'utterance' insert closing parenthesis mark.

P. 62, footnote 57: add, 'During later investigation one unit with initial velar nasal has been recorded: /ŋauwa/ 'incantation word.' This specialized term may be an obsolete form or an unassimilated loan word from GD; it is unknown to most younger speakers. Other morphemes occurring in GD with initial /ŋ/ occur in LGV with initial /n/. It is suggested that morpheme initial occurrence of velar nasal may be considered extra-systematic like initial /ts/ in English 'tsetse.' '

P. 63, line 5: for '/uok/' read '/uwok/.'

P. 63, last paragraph, line 1: after '/j/' insert comma.

P. 63, last paragraph, line 3: for '/omo/' read '/oumo/.'

P. 63, footnote 58: revise to read, 'This last form is not a single morpheme,...'

P. 65, line 5: change gloss of /took-hoko/ to read 'separating (man's name).'

P. 65, section 3.2122, line 6: delete the rest of the sentence after 'vowel.'

P. 65, footnote 65: change gloss of /ouwak/ to 'side of the hip.'

P. 75, line two: add, 'Note the adoption of the symbols 'y' and 'v' as described in the preface to the published edition.'

P. 75, line 15: add, 'Note the adoption of the digraphs 'bp' and 'dl' as described in the preface to the published edition.'

P. 80, end of first paragraph: add, 'Note the abandonment of the use of two consecutive punctuation marks, as described in the preface to the published edition.'

P. 83, line 9 of text: for 'of' read 'by.'

P. 95, line 6: for '(pakke' read '(-pakke.' For 'wuukha-hupɪ' read 'wukka-hupɪ.' For 'hoto' read 'hotok.'

P. 95, line 15: for 'hupɪk-kiak' read 'hupɪk-kijak' in both places.

P. 95, line 17: for 'hinakèn' read 'hɪnakèn.'

P. 95, line 18: for 'wattɪlɪk-he' read 'wat-hɪlɪk-he.'

P. 95, line 21: for 'akeikhén-en-he'' read 'akeikhé-nen-he'.'

P. 96, line 3: for 'pukima' read 'puki-ma.'

P. 96, line 4: for 'wukha-hupɪ' read 'wukka-hupɪ.'

P. 96, section II, line 2: for 'hinaken' read 'hInaken.' For 'WathIlIk-he;' read 'Wat-hIlIk-he;.'

P. 96, section II, line 3: for 'NUkhUnem-en' read 'NUgUnem-en.'

P. 96, section II, line 4: for 'wathIlIk-he' read 'wat-hIlIk-he.'

P. 96, next to last line of section II: for 'Eilelekhwe-lak' read 'Eilelegwe-lak.'

P. 96, end of section II: add, 'Note that in the practical orthography adopted as described in the preface to the published edition the punctuation of this section would be much simpler, and upper case 'I' and 'U' would be replaced by 'y' and 'v.'

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CHAPTER I

THE APPROACH TO THE PROBLEM

"Our talk is straight; theirs has an angle bent." So the people of the lower Grand Valley of the Baliem, central Netherlands New Guinea, refer to their neighbors' dialects and their own. The figure is unconsciously apt, for a comparison of the sound systems of those dialects reveals a non-congruity, a skew of pattern, by which some not greatly dissimilar phonetic inventories are arranged into quite different phonemic structures. The original objectives of this study, a description and an alphabetic symbolization of the exceptionally aberrant structure from that lower Grand Valley area, have proved to be reached most meaningfully along the route of comparison with other dialects, so that that one pattern of sound contrasts is seen not only in terms of its inner configuration but also in the perspective of the disparate patterns of the parent and most other daughter dialects, and that the orthography facilitates cross-dialect reference.

1.1 THE BACKGROUND OF THE STUDY

The dialects included in this study are of a language family now best known as Dani, languages of which are spoken by perhaps 200,000 sweet potato horticulturalists in the Baliem, Hablifoerie, upper Lorentz, Swart, Nogolo, Tinak, Ilaga and Dugindoga valleys of the central highlands of Netherlands New Guinea.[1] As early as 1907 contact with these peoples,

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[1] In the Baliem Grand Valley the word [ɓanɩ], with an initial implosive, or [lanɩ], is a clan name, but in western valleys it is used as a name for the language spoken there. The Monis, members of the next tribe to the

there called Pesegem, and a short vocabulary check of their language were made by the Lorentz expedition in the valley which bears his name.[2] In 1920 to 1922 the two Kremer expeditions traversed the Swart and crossed the North Baliem valleys; Paul Wirz published valuable information on the Oeringoep culture and language of the Swart area from his stay of several months there with that expedition.[3] The Stirling expedition made brief contacts with some visitors from western Dani valleys in 1926, and the vocabulary lists gathered then have been published by le Roux.[4] Although the Netherlands-American scientific expedition of 1938 under the leadership of Richard Archbold discovered Grand Valley and made significant contributions to other fields of knowledge, the data published on the language are negligible.[5] Margaret Hastings, rescued survivor of a military aircraft crash at the rim of Grand Valley in 1945, reports that the one word learned by their military party was "uhn."[6]

Intensive study of these languages began with the entrance of missionaries, including the writer of this thesis, into lower Grand Valley in April, 1954.[7] During the next two years work was confined to that dialect

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west, pronounce this name [ⁿdanɩ], with a prenasalized stop. All these forms of the name, as well as other clan names like Pesegem and Morip and probably Oeringoep, occur in the literature, but the name Dani is now applied by mission and government to any of the peoples speaking languages of this family.

[2]That check list can be found compiled with others in the appendix to Volume II of C. C. F. M. le Roux, Bergpapoeas van Nieuw Guinea en hun Woongebied (Leiden, 1950).

[3]P. Wirz, Anthropologische und ethnologische Ergebnisse der Central Neu Guinea Expedition 1921-22 (Leiden, 1924).

[4]C. C. F. M. le Roux, loc. cit.

[5]The general report of that expedition contains no linguistic data,

area, and the phonemic structure described here gradually became apparent. Only when the work expanded into other parts of Grand Valley in 1956 did the radical difference of that phonemic pattern from those found in other areas become painfully obvious, particularly when attempts were made to develop orthographies useful for more than one dialect. Those practical problems led to the descriptive approach followed in this study.

1.2 THE THESIS TO BE DEVELOPED

The approach followed departs from conventional synchronic description by inclusion of diachronic and comparative material both for perspective in presentation of the structure of a single dialect and as a determinant in the construction of a practical orthography. Indeed, the thesis developed in the following chapters is that a skewed or non-congruent relationship of the phonemic pattern of one dialect to that of parent and other daughter dialects indicates the relevance of the structures of those dialects to a description of and orthography for the aberrant system. A description of the phonemic structure of lower Grand Valley Dani in relationship to other Dani dialects is the case study used to demonstrate and illustrate this

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but includes a complete bibliography of other reports: Richard Archbold, A. L. Rand and L. J. Brass, Results of the Archbold Expeditions, No. 41: Summary of the 1938-1939 New Guinea Expedition (New York, 1942), pp. 286-88. The only vocabulary list published from that expedition is in le Roux, loc. cit.

[6] Margaret Hastings, "A WAC in Shangri La," Reader's Digest, November, 1945, pp. 1 ff.

[7] Following that entrance by the Christian and Missionary Alliance, men of the Unevangelized Fields Mission occupied the upper Hablifoeri area and later the Wodo [wo̱o] valley, where Ross Bartel has made valuable studies of the language. In cooperation with these two missions the Australian Baptist mission entered the North Baliem valley in 1956; there Mrs. Sheila Draper has done significant linguistic work. Christian and Missionary Alliance worker Gordon Larson has made very valuable studies of Ilaga Dani.

proposition. To present this material four chapters follow: Chapter II contains a survey of the phonemic systems of proto-Dani and eight extant dialects; Chapter III is a detailed phonemic description of one of those, the lower Grand Valley dialect, with special reference to the skewed consonant pattern; in Chapter IV an orthography that facilitates cross-dialect reading and comparison is developed for that aberrant dialect; and Chapter V is a concluding statement pointing toward wider implications of the thesis for the study of language and culture.

1.3 AREAS OF RELEVANCE OF THE STUDY

As a structural study from a language family previously known only by vocabulary check lists and short paradigms, the material presented will interest the descriptivist who wishes as complete as possible a sampling of human languages; he will also find here a brief for diachronic and comparative perspective in synchronic description. The dialect geographer may discover an illustration of the comparison of dialects on the basis of phonemic patterns of structurally relevant contrasts. Such comparison goes beyond vocabulary lists and noting of phonetic differences, which are of necessity heard in terms of distinctions made by the investigator.[8] For the worker in literacy campaigns, the study explores ways of constructing orthographies of usefulness for dialects with differing phonemic systems. The problems presented offer to the anthropologist of wider interests examples of the rearrangement into distinctive configurations of traits shared by adjacent populations. Methodologically, here is an indication that the study of whole culture patterns need not set up totally

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[8] Vocabulary checks of the Swadesh hundred item list have been widely made. Some samples from that material are included in Appendix B.

disparate units which preclude comparison of the composite parts, but rather establishes the most relevant criteria for that comparison. Even the orthographic study may be suggestive for symbolism of structural units in cultural comparative studies. Language, with its greater homogeneity of data, its more apparent structure, its smaller, more closed system, here serves as a kind of micro-culture, a reduced, sharply defined image of what is surely operative but is more nebulous to define and describe for culture as a whole.

CHAPTER II

A SURVEY OF PHONEMIC PATTERNS OF DANI DIALECTS

Skewness is a term implying comparison. In the case of the phonemic pattern of lower Grand Valley Dani, the data for comparison are the corresponding patterns of other dialects thus far studied. For clarity the hypothetical phonemic pattern of proto-Dani is presented first as a reference point for the data from which it was in fact constructed. There follow sketches of the sound systems of eight extant dialects arranged roughly in geographic order from northwest to southeast, on the basis of areas where they are spoken. These areas may be identified on the maps in Appendix A.

2.1 THE PATTERN OF PROTO-DANI

The phonemic pattern of proto-Dani, which will be referred to in the following pages as PD, can be inferred with considerable certainty from the extant dialects thus far studied. As seen in Table I, there were three sets of stops, the first two sets occurring at labial, gingival, velar and labio-velar points of articulation. The first set was voiced and probably also prenasalized. The second, aspirate set had voiceless aspirated stop allophones [p^h, t^{sh}, k^h, k^{wh}] at the beginnings of spans of speech between pauses and probably some other junctures; voiced allophones [b, ɾ, g, g^w], of which the second was a backward flap, the others voiced fricatives, between vowels; and voiceless stop allophones, perhaps unreleased [$p^{\cdot}$, $t^{\cdot}$, $k^{\cdot}$], at the ends of spans between pauses and before other consonants in the middle of those spans. The labiovelar */k^w/ apparently did not occur before pause. There were only two implosive stops, bilabial and gingival, and the

TABLE I

THE PHONEMIC PATTERN OF PROTO-DANI

CONSONANTS: MANNER OF ARTICULATION	POINT OF ARTICULATION: LABIAL	GINGIVAL	VELAR	LABIO-VELAR
Voiced stops	b	d̄	g	g^w
Aspirate stops	p [p^h, ɓ, ^{p}]	t [t^{sh}, ɾ, ^{t}]	k [k^h, g̈, ^{k}]	k^w [k^{wh}, g^w]
Implosives	β	δ [δ, ɾ̣]		
Nasals	m	n	ŋ	
Lateral		l		
Consonantal Vocoids	w	j		

VOWELS: TONGUE HEIGHT	TONGUE POSITION FRONT TO BACK, LIP SHAPE: FRONT UNROUNDED	CENTRAL	BACK ROUNDED
High close	i		u
High open	ɩ		ʊ
Mid	e		o
Low		a	

latter had a frontward flap allophone between vowels. In the nasal series the velar */ŋ/ has been lost or has lost a significant functional load in most of the daughter dialects, but was probably part of the original pattern. The phonetic value of the lateral is not certain. Consonantal vocoids */w/ and */j/ unquestionably occurred in PD. Glottal stop was probably a terminal or junctural phenomenon occurring before vowels at the beginnings and possibly also at the ends of certain speech spans; it is therefore not included as a full phoneme in Table I. The vowel pattern

is less certain than the consonant pattern, but it included at least the seven vowels shown in Table I.

PD voiced stops and implosives occurred only initially and medially in morphemes, words and spans between pauses. Consonantal vocoids occurred only initially in morphemes, but also medially in the larger units. Only aspirate stops and liquids, i.e. nasals and the lateral, occurred initially, medially and finally. Morpheme medially, consonant clusters of the following types occurred: possibly aspirate stop followed by voiced stop; aspirate stop followed by aspirate stop in geminate cluster; aspirate stop followed by implosive; aspirate stop followed by liquid; liquid followed by liquid. Clusters of two vowels probably occurred morpheme medially.

2.2 THE PATTERN OF WESTERN DANI

The geographically most widespread group of extant dialects is that called western Dani, abbreviated WD in the following pages; dialects of this type have been recorded in the North Baliem, Swart, Tinak, Ilaga and extreme upper Hablifoeri valleys.[1] From the high degree of homogeneity of the materials recorded in these various areas and observations of travelers, it appears that these dialects are easily mutually intelligible and constitute a language. There is a sharp break in phonemic pattern, grammatical structure and vocabulary where these dialects abut the dialects of Grand Valley, although those living along the border understand each other easily, perhaps from long association. As seen in Table II, the common sound system

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[1]Data for the Tinak and Ilaga areas are from unpublished materials by Gordon Larson. Scattered references and the lists in P. Wirz, op. cit., are confirmed by the less intensive studies of missionaries in the Swart and indicate its inclusion here. Hablifoeri data are from Ross Bartel, and

TABLE II

THE CONSONANT PATTERN OF WESTERN DANI

MANNER OF ARTICULATION	POINT OF ARTICULATION				
	LABIAL	GINGIVAL	VELAR	LABIO-VELAR	GLOTTAL
Prenasalized voiced stops	^{m}b	^{n}d	^{ŋ}g	$^{ŋ}g^{w}$	
Aspirate stops	p	t	k	k^{w}	
	[p^{h}, ɓ, ^{p}]	[t^{sh}, ɾ, ^{t}]	[k^{h}, g, ^{k}]	[k^{wh}, g^{w}]	
Nasals	m	n (= PD */l/, */n/, */ŋ/)			
Lateral		l (= PD */ð/)			
Glottal stop					
Consonantal vocoids	w	j [j, ž]			

of these dialects has the PD voiced stop series definitely prenasalized and the aspirate stop series unchanged. The implosives are missing: WD /p/ corresponds to PD */p/ and */β/; WD /l/ corresponds to PD */ð/. WD /n/ corresponds to PD */l/, */n/ and */ŋ/. Glottal stop occurs as a segmental phoneme both in forms apparently representing a fusion of PD forms including a juncture, and as a correspondence of PD aspirate stops in cluster before liquids and voiced stops. The consonantal vocoid /j/ occurs with voiced sibilant allophone [ž] before /i/ and /u/. The vowel pattern of PD is unchanged in WD. In distributional restrictions WD resemoles PD, with prenasalized stops initially and medially in morphemes, words and spans between pauses; glottal stop occurs with those restrictions also, and in at least most of the WD dialects /l/ is similarly distributed. Aspirate stops, nasals and consonantal vocoids occur as in PD, except that glottal stop replaces aspirate stops in cluster when followed by a nasal or a

North Baliem data are from unpublished materials of Sheila Draper and from the author's own field notes.

prenasalized stop. Complete data on cluster patterns are not available at present.

2.3 THE PATTERN OF WODO DANI

A dialect with consonant pattern only slightly modified from PD is spoken in the Wodo [woĭo] valley and in a limited area around Pyramid Mountain in upper Grand Valley.[2] There /ŋ/ is missing and glottal stop /'/ occurs, as in WD. As appears in Table III, Wodo valley Dani or WV has only five vowels, /i/ corresponding to PD */i/ and */ɪ/, /u/ to PD */u/ and */ʊ/.

TABLE III

THE PHONEMIC PATTERN OF WODO VALLEY DANI

CONSONANTS: MANNER OF ARTICULATION	POINT OF ARTICULATION: LABIAL	GINGIVAL	VELAR	LABIO-VELAR	GLOTTAL
Prenasalized voiced stops	^{m}b	^{n}d	^{ŋ}g	$^{ŋ}g^{w}$	
Aspirate stops	p	t	k	k^{w}	
	[p^{h}, ƀ, ^{p}]	[t^{sh}, ɤ, ^{t}]	[k^{h}, ɠ, ^{k}]	[k^{wh}, ɠ^{w}]	
Implosives	ɓ	ɗ [ɗ, ɪ̣]			
Nasals	m	n (= PD */n/, */ŋ/)			
Lateral		l			
Glottal stop					
Consonantal vocoids	w	j			
VOWELS: TONGUE HEIGHT	TONGUE POSITION FRONT TO BACK, LIP SHAPE: FRONT UNROUNDED	CENTRAL		BACK ROUNDED	
High	i			u	
Mid	e			o	
Low		a			

[2] Wodo valley data are from Ross Bartel; Pyramid area data are from the author's own field notes.

With regard to the distribution of the phonemes, WV follows the pattern of PD except that glottal stop occurs: (1) at the beginnings of spans of speech between pauses; (2) between vowels; and (3) replacing aspirate stops in cluster before implosives.

2.4 THE PATTERN OF LOWER KIBIN DANI

A dialect very similar to WV, with only phonetic differences, is spoken in the upper central part of Grand Valley along the lower Kibin and Wosi rivers; this dialect will be referred to as KV in the following pages.[3] The phonemic pattern of WV as given in Table III is valid for KV, but at the beginnings of spans of speech between pauses and certain junctures, the prenasalized stops are voiceless or voiced in free variation, and voiceless sibilant [s] occurs as an allophone of /t/ between vowels one of which is a high vowel. In some words this allophone [s] corresponds to WD [ɛ], so that the phonemic shape of those words is altered. The distribution of the phonemes is generally the same as in WV.

2.5 THE PATTERN OF LOWER BELE DANI

Phonetically further from PD than is WV or KV, is a dialect spoken in central Grand Valley in the region around the lower Bele river; this lower Bele dialect will be referred to as BV in the following pages.[4] As presented in Table IV, BV correspondences of PD voiced stops are voiceless prenasalized or voiceless unaspirated after pause or certain junctures, with sub-dialectic variation. Between vowels a parallel sub-dialectic variation

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[3]Data for this dialect are from sketchy field notes by the author.

[4]Data for this dialect are from a cursory vocabulary check by the author and from text recorded from a man now living in the AV area.

TABLE IV

THE PHONEMIC PATTERN OF LOWER BELE DANI

CONSONANTS:

MANNER OF ARTICULATION	POINT OF ARTICULATION				
	LABIAL	GINGIVAL	VELAR	LABIO-VELAR	GLOTTAL
Unaspirated stops	$[{}^{m_b}p,\ p,\ {}^{m_b}][{}^{n_d}t,\ t,\ {}^{n_d}][{}^{\eta_g}k,\ k,\ {}^{\eta_g}][{}^{\eta_{g^w}}k^w,\ k^w,\ {}^{\eta_{g^w}}]$				
Aspirate stops	p	t	k	k^w	
	$[\underline{p},\ p^h,\ \underline{b},\ [t^{sh},\ s,\ \underline{r},[h,\ x,\ \underline{g},\ [\underline{g}^w]$				
	$p_]$	$t_]$	$k_]$		
Implosives	β	δ [δ, $\underset{\cdot}{r}$]			
Nasals	m	n (= PD */n/, */η/)			
Lateral		l			
Glottal stop					
Consonantal vocoids	w	j			

VOWELS:

TONGUE HEIGHT	TONGUE POSITION FRONT TO BACK, LIP SHAPE		
	FRONT UNROUNDED	CENTRAL	BACK ROUNDED
High close	i		u
High open	ɪ		ʊ
Mid	e		o
Low		a	

of prenasalized voiceless and prenasalized voiced stops occurs. The PD aspirated stop series is represented at the beginnings of spans between pauses or certain junctures by voiceless fricative [$\underline{p}$] allophone of /p/, and voiceless vocoid [h] allophone of /k/ as a correspondence both to PD */k/ and */k^w/; /k^w/ does not occur in this position. Gingival /t/ is represented by voiceless sibilant [s] adjacent to high close vowels initially and medially in all units. Allophones [p^h] of /p/, [t^{sh}] of /t/, both voiceless aspirate stops, and [x], a fricative, of /k/, occur as second

members of consonant clusters. In other respects the formation of BV consonants follows the pattern of KV, but BV has the full seven vowel pattern of PD.

2.6 THE PATTERN OF LOWER AIKHE DANI

The first step toward a breakup of the PD aspirate stop phonemes may be observed in a dialect spoken in lower central Grand Valley areas around the lower Aikhe river; this dialect will be referred to as AV.[5] Table V shows the consonant pattern, in which correspondences of PD voiced stops are voiceless and unaspirated. The implosives occur as in PD. In the aspirate series /p/ no longer occurs word initially, where voiceless vocoid [h] now corresponds to PD */p/, */k/ and */k^w/. This allophone also corresponds to PD */k/ as second member of consonant clusters and can be assigned to /k/. Voiceless fricative allophone [p] represents /p/ as second member of clusters. Voiceless sibilant [s] contrasts with the flap [ɾ] allophone of /t/ and thus must be assigned to a separate phoneme /s/. AV like BV has the seven vowel pattern of PD.

2.7 THE PATTERN OF LOWER GRAND VALLEY DANI

The dialect of lower Grand Valley, abbreviated LGV, is spoken along the Baliem from the Uwe river to some point below the Muki river. This dialect has been studied more intensively than any other; of the dialects studied, it is the most askew with the PD phonemic pattern.[6] As Table VI shows, one set of stops occurs; these, with phonemes /s/ and /h/ and the lateral /l/ correspond to the three sets of PD stops. The phoneme /h/

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[5] Data for this dialect are from the author's field notes.

[6] An intensive study of this dialect was made by the author during residence in the area from April, 1954, to July, 1956, and on later visits.

TABLE V

THE CONSONANT PATTERN OF LOWER AIKHE DANI

MANNER OF ARTICULATION	POINT OF ARTICULATION				
	LABIAL	GINGIVAL	VELAR	LABIO-VELAR	GLOTTAL
Unaspirated stops	b [p]	d [t]	g [k]	g^w [k^w]	
Aspirate stops	p	t	k	k^w	
	[b, ^{p}, p]	[t^{sh}, ɾ, ^{t}]	[h, g, ^{k}]	[g^w]	
Sibilant		s			
Implosives	ɓ	ɗ [ɗ, ɾ̣]			
Nasals	m	n (= PD */n/, */ŋ/)			
Lateral		l			
Glottal stop					
Consonantal vocoids	w	j			

corresponds unit initially to PD */p/, */k/, */k^w/ and */ɓ/. LGV /h/ and /s/ contrast with each of the voiced intervocalic phones [b], [ɾ], [g], and [g^w], but those phones and the final voiceless stop phones [^{p}], [^{t}] and [^{k}] are still in complementary distribution as in PD and can be assigned as allophones with the voiceless unaspirated stop correspondences of PD voiced stops. This is impossible in AV, where unaspirated stop correspondences of intervocalic PD voiced stops contrast with affricated and aspirated stop correspondences of intervocalic PD geminate clusters of aspirate stops; in LGV these two kinds of correspondences coincide and are both interpreted as geminate clusters of the stops of the one series. Except for the correspondence of unit initial /h/ to PD */ɓ/, PD implosives are represented in LGV generally as in WD, with /p/ corresponding to other occurrences of */ɓ/, and /l/ corresponding to all occurrences of */ɗ/. Velar nasal /ŋ/ occurs in LGV, but only in morpheme medial and final

TABLE VI

THE CONSONANT PATTERN OF LOWER GRAND VALLEY DANI

MANNER OF ARTICULATION	POINT OF ARTICULATION				
	LABIAL	GINGIVAL	VELAR	LABIO-VELAR	GLOTTAL
Stops[7]	p	t	k	k^w	
	[p, b, ^{p}]	[t, ɾ, ^{t}]	[k, g, ^{k}]	[k^w, g^w]	
Voiceless continuants		s		h [M, N, ɲ, ɬ]	
Nasals	m	n	ŋ		
Liquids: Lateral		l			
Glottal stop					
Consonantal vocoids	w	j			

position and always in free variation with /n/. Glottal stop corresponds to PD aspirate stops in cluster followed by liquids and also occurs, as in other dialects, contrastively between vowels. The seven vowels postulated for PD occur in LGV, but are augmented by two-part syllabics /ei/, /ai/, /oi/, /au/ and /ou/. The whole phonemic structure of LGV is described in Chapter III; section 3.2 presents the distributional restrictions.

2.8 THE PATTERN OF GORGE DANI

Down river from the LGV area, in the rough country along the gorge below the confluence with the Muki, lies a region called Basema; the dialect spoken there will be referred to as GD in the following pages.[8] This dialect, like dialects on the other side of the LGV area, corresponds more closely to PD in phonemic pattern than does LGV. Table VII shows the consonant pattern with two sets of stops. Aspirate /p/ is represented

[7] Other allophones are described in Chapter III.

[8] A brief vocabulary check of this dialect has been made by the author.

TABLE VII

THE CONSONANT PATTERN OF GORGE DANI

MANNER OF ARTICULATION	POINT OF ARTICULATION				
	LABIAL	GINGIVAL	VELAR	LABIO-VELAR	GLOTTAL
Unaspirated stops	b	d	g	g^w	
	[b, p]	[d, t]	[g, k]	[g^w, k^w]	
Aspirate stops	p	t	k	k^w	
	[p, b, p]	[r, t]	[h,x,g, k]	[g^w]	
Sibilant		s			
Nasals	m	n	ŋ		
Lateral		l			
Glottal stop					
Consonantal vocoids	w	j			

word initially by voiceless fricative [p], and aspirate /k/ is represented in that environment by [h] and voiceless velar fricative [x] in apparently free variation. Sibilant /s/ contrasts with flap [r] allophone of /t/, which does not occur word initially. PD implosives are represented by [h], an allophone of /k/, and by /p/ and /l/ as they are represented by /h/, /p/ and /l/ in LGV. Velar nasal /ŋ/ occurs in this dialect unit initially as well as medially and finally. The vowel pattern probably includes seven vowels, but further investigation of this and of distributional regularities is needed.

2.9 THE PATTERN OF MID-HABLIFOERI DANI

Still more congruent than GD with the PD phonemic pattern is a dialect spoken in the valleys of the Kapia and Kulet rivers, tributaries flowing into the mid-Hablifoeri, across the range to the east of the LGV area.[9]

[9] A cursory vocabulary check of the dialect was made by the author.

This dialect will be referred to as MH. A preliminary check indicates that the PD consonant pattern, plus glottal stop, occurs in this dialect. Correspondences of PD voiced stops are voiced stops at the beginnings of spans of speech between pauses, and prenasalized voiced stops between vowels. The aspirate stop /p/ is represented by a heavily aspirated voiceless stop [p^h] initially in spans between pauses, where aspirate stop /t/ is represented by conditioned variants [t^{sh}] and sibilant [s], and aspirate stop /k/ occurs as voiceless vocoid [h], voiceless velar fricative [x] and heavily aspirated stop [k^h] in a pattern of complementation and free variation. It appears probable that sibilant [s] is not in contrast with flap [ɾ]. In MH the implosives occur, although the pattern of allophone distribution is not yet clear. A tentative chart of this consonant system is presented as Table VIII.

TABLE VIII

THE CONSONANT PATTERN OF MID-HABLIFOERI DANI

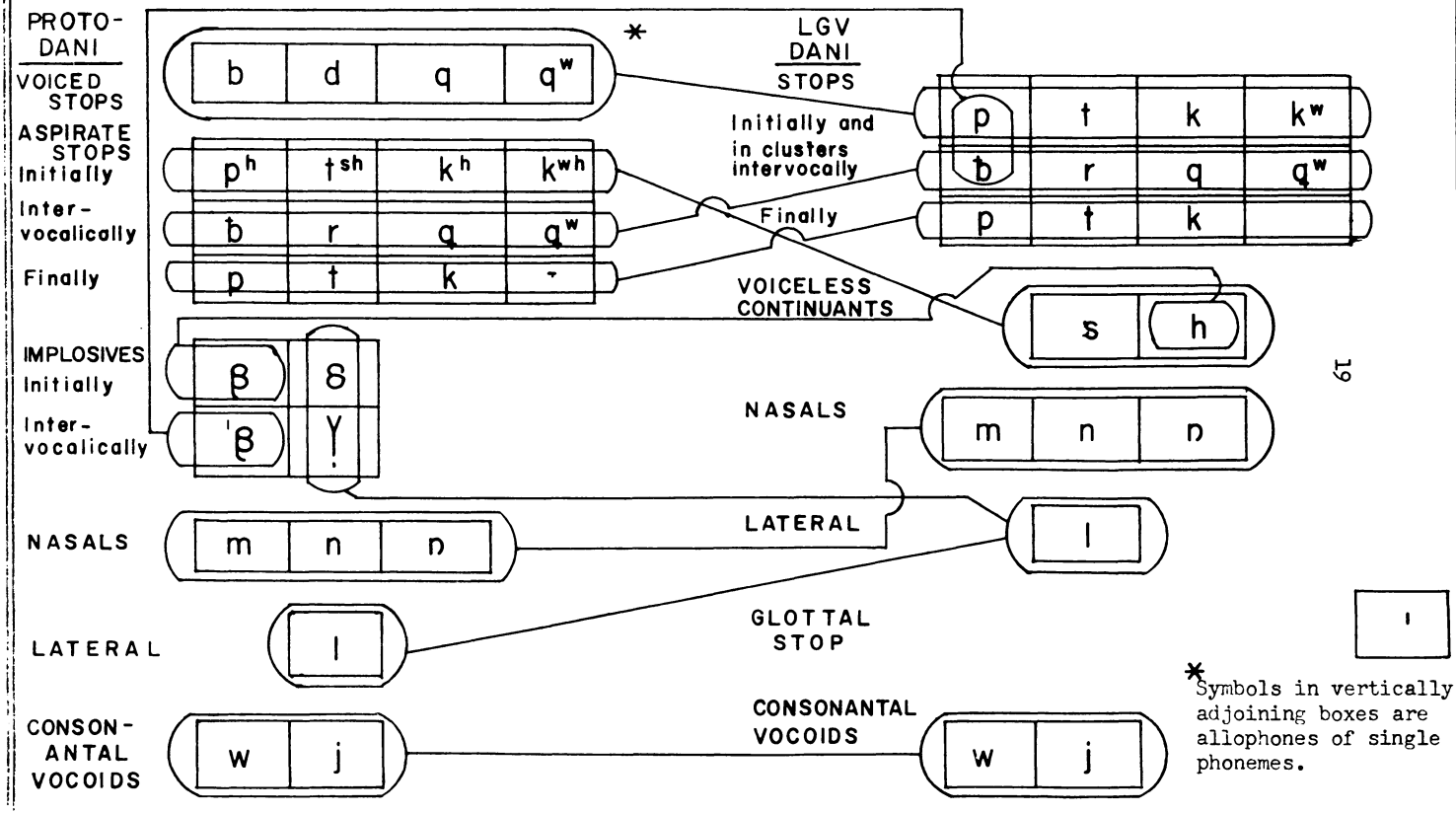
MANNER OF ARTICULATION	POINT OF ARTICULATION LABIAL	GINGIVAL	VELAR	LABIO-VELAR	GLOTTAL
Unaspirated stops	b	d	g	g^w	
	[b, ^{m}b]	[d, ^{n}d]	[g, ^{ŋ}g]	[g^w, ^{ŋ}g^w]	
Aspirate stops	p	t	k	k^w	
	[p^h, ɓ, ^{p}]	[t^{sh}, s, ɾ, ^{t}]	[k^h, h, x, ɣ, ^{k}]	[k^{wh}, x^w (?), $ɣ^w$]	
Implosives	ɓ	ɗ			
Nasals	m	n	ŋ		
Lateral		l			
Glottal stop					
Consonantal vocoids	w	j			

2.0 SUMMARY OF THE SURVEY

The phonemic patterning of the correspondences of PD stops divides the eight extant dialects into three major groups. Five dialects, WV, KV, BV and AV from Grand Valley with MH from across the range, retain three sets of stops, although in AV, distributional limitations and the occurrence of sibilant /s/ as a separate phoneme indicate the beginning of a breaking up of the aspirate series. Two dialects, WD and GD from the extremities of the Baliem valleys, have two sets of stops, with the implosives missing. Only LGV has a single set of stops, which, together with voiceless continuants /s/ and /h/ and lateral /l/, correspond to the three sets of PD stops. The evidence for the material presented in this chapter can be seen in the lists of cognate forms in Appendix B. Table IX summarizes the non-congruity of LGV with PD by comparing the two consonant patterns and indicating the corresponding allophones in their contrasting phonemic arrangements. Allophones of PD correspond to the allophones of LGV with which they are linked by connecting lines between the circles around the phonetic symbols. Linked sets correspond as sets. Study of this table and of the preceding tables will indicate the basic non-congruity of the phonemic patterns of PD and LGV consonants.

TABLE IX

A COMPARISON OF THE CONSONANT PATTERNS OF PROTO-DANI AND LGV-DANI



CHAPTER III

THE PHONEMIC STRUCTURE OF LOWER GRAND VALLEY DANI

Skewness implies internal configuration as well as comparison. In Chapter II emphasis was placed upon comparison, and section 2.7 focused attention on the phonemic pattern of lower Grand Valley Dani as askew with the patterns of proto-Dani and other extant dialects. This chapter is a detailed description of that one atypical structure with the perspective afforded by the preceding survey. An examination of the distribution of allophones as members of phonemes precedes treatment of the distribution of the phonemes themselves within larger units.

3.1 THE DISTRIBUTION OF ALLOPHONES OF PHONEMES

3.11 List of the phonemes

The segmental phonemes of LGV consist of thirteen consonants and seven vowels: stops /p, t, k, k^w/; voiceless continuants /s, h/; liquids, including nasals /m, n, ŋ/ and lateral /l/; glottal stop /'/; consonantal vocoids /w, j/; high close vowels including front unrounded /i/, back rounded /u/; high open vowels including front unrounded /ɪ/, back rounded /ʊ/; mid vowels including front unrounded /e/ and back rounded /o/; low central vowel /a/. Besides these segmental items there are larger units, which may conveniently be termed macrophonemic.[1] These include the following: (1) The syllable occurs with central syllabic, symbolized by vowel letters. Syllable

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[1] Pike's treatment of these levels of phenomena has been germinal for this analysis, but the term macrophonemic seems preferable to his hyperphonemic. A macrophonemic unit is part of a contrastive system of units larger than the segmental phoneme, although terminals of such units may be no longer phonetically than a single segment. See Kenneth L. Pike, Language in Relation to a Unified Theory of the Structure of Human Behavior (Glendale, 1955), Part II, pp. 41 ff.

terminal or border is non-contrastive in the system.[2] (2) The phonological word occurs with one central predictably stressed syllable, and with or without independent secondary stress. Word terminal is marked by single space. Included in some words is a smaller unit, word nucleus, with central predictably stressed syllable and nucleus terminal, written with a hyphen. The segment of such a word between nucleus terminal and word terminal is a clitic. A few words include two nucleus terminals; the first divides word nucleus from the clitic, and the second divides what may be termed larger word nucleus from the final clitic. Thus where two nucleus terminals occur the clitic includes part of the larger nucleus, and the final clitic; and the larger nucleus includes part of the clitic. (3) The intonation contour group is characterized by central contour stress, symbolized by acute accent mark, and final contour terminal of one of two sorts. Plus contour terminal is indicated by plus mark; zero contour terminal is indicated by zero written following the numbers indicating contour pitches. Associated with the contour terminals are intonation levels and contours marked by superscript numbers from one, highest, to four, lowest, above the segmental material. (4) The phonological sentence includes central sentence stress, indicated by circumflex accent mark, and sentence terminal, indicated by a period. Two further macrophonemic modifications are considered contrastive but not part of the system comprising the four units described above: (1) Vowel voicelessness contrasts with normal voicing of vowels and is symbolized by subscript circle. (2) Extra vowel length is indicated by colon following the superscript number marking the intonation level of the lengthened vowel.

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[2] For one problem area relative to syllable terminal, see the note on section 3.1215 relative to consonantal vocoids.

3.12 The distribution of allophones of the segmental phonemes[3]

In the following discussion, the allophone first introduced under each phoneme is to be assumed to occur in all environments possible for that phoneme which are not included in the ranges of distribution stated for other allophones. Thus all allophones of any phoneme are to be assumed to be in complementary distribution unless conditions of free variation are stated. All possibilities of freely varying allophones are listed only in illustrations where the free variation in question is described; it is to be assumed that the variation also occurs in all other data which include the phoneme in question in an environment for which the variation is described.

3.121 Consonants. All non-vocoids and presyllabic vocoids are consonants.

3.1211 Stops and voiceless continuants. These two sets of phonemes represent the major correspondences of PD stops and are thus the sets where LGV skewness is most apparent.

3.12111 Stops / p, t, k, k^{w}/. The stops are represented principally by allophones produced at bilabial, gingival, backed velar and labialized

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[3]Symbolization of the macrophonemic units is omitted until those units are described, unless they are clearly relevant to the discussion. Symbols used for phonetic transcription are those commonly used by American linguists, except that [r] is gingival backward flap; [t̃] is a lamino-gingival stop; [ɸ] and [ɣ] are voiced bilabial and back velar fricatives, respectively; [k] is a back velar stop; [k̃] and [g̃] are one segment lamino-palatal voiceless stop and voiced fricative, respectively; a stop symbol raised above the line, e.g. [p̄], represents an unreleased stop; [ŋ̇] is a voiced velar nasal; [j] is a high close front unrounded pre-syllabic vocoid; ['] is glottal stop; [ɜ] is lowered mid open front unrounded vocoid; [c] is mid open back rounded vocoid. Vocoid symbols written above the line represent vocoid offglide quality when following another vocoid symbol, but vocoid timbre or articulatory position when following non-vocoid symbols. Thus [a^{i}] marks a low fronted central vocoid with offglide toward [i]; [l^{o}] indicates a lateral with [o] timbre. Following velar consonants, symbols for round vocoids written above the line indicate lip shape for

backed velar points of articulation, respectively, with some types of articulation common to the set and some minor types of articulation peculiar to the individual phonemes.

Word initially, stops occur voiceless and unaspirated: /pete/ [p3r3] 'two'; /te/ [t3] 'take it'; /ket/ [k3^{t}] 'new'; /k^{w}e, ke/ [k^{w}3, k3] 'trail.'[4]

Before plus contour terminal, stops occur as voiceless released and unreleased in free variation; /k^{w}/ does not occur in this environment: /ap+ / [...ap$^{4-5}_{h}$, ...a^{p}$^{4-5}$] '(It's) a man'; /at+ / [...at$^{4-5}_{h}$, ...a^{t}$^{4-5}$] '(It's) he or she'; /nak+ / [nak$^{4-5}_{h}$, na^{k}$^{4-5}$] 'Let me eat it.'

Between vocoids, i.e. vowels and consonantal vocoids, except word initially or before plus contour terminal, stops occur represented by voiced allophones [b, r, g, g^{w}], respectively, of which the bilabial, backed velar and labio-velar allophones are fricatives and the gingival allophone is a backward tongue flap: /ap-a/ [...àba] 'a man (questioning)'; /apan/ [...aban] 'unfinished'; /at-a/ [àra] 'he or she (questioning)'; /sotom/ [scrom] 'sneaking'; /nak-a/ [nàga] 'shall I eat it?' /ake/ [...ag3] 'his, her, its tail'; /ak^{w}e, ake/ [...ag^{w}3, ...ag3] 'his wife.'[4]

In clusters which are not geminate, i.e. preceding or following a non-identical consonant with no intervening plus contour terminal, except as noted below under particular phonemes, stops are voiceless and as first

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production of one sort of labialized velars; [k^{o}] indicates a voiceless velar stop with simultaneous labialization with lip shape as for [o]. Sequences of periods [...] indicate any phonation in the same contour. A raised dot following a symbol indicates a half mora of added phonetic length: [p·]; colon following a symbol indicates a full mora of added phonetic length: [p:]. Grave accent marks phonetic stress: [à]. Subscript apostrophe indicates syllabicity: [n̩]. [V] stands for any syllabic vocoid phone; [C] stands for any consonant phone. Comma between bracketed forms indicates free variation of those forms. Underlined material between brackets is comment on the forms with which it occurs.

members of clusters are unreleased: /akte/ [...a^{k}t3] 'his groin'; /leketma, leke'ma/[l3g3^{t}ma, l3g3'ma] 'on the fence.'

Geminate clusters of stops are interpreted to occur; phonetically these are single stops with a free variant of slightly lengthened counterparts:[5] /appe/ [...ap3, ...ap·3] 'his, her mouth'; /ap pete/ [...àp3r3̀, ...àp·3r3̀] 'two men'; /attem/ [...at3m, ...at·3m] 'there'; /akko/ [...akc, ...ak·c] 'his, her pig'; /ak^{w}k^{w}e/ [...ak^{w}3, ...ak^{w}·3] 'its opening.'[6]

The phoneme /p/, besides released, unreleased or lengthened voiceless unaspirated bilabial stop and voiced bilabial fricative allophones in environments [pV], [Vp^{h}+, V^{p}+], [VpV, Vp·V] and [VpV], as described above, is also represented by the following: (1) As first member of a cluster with liquids /m, n, l/, /p/ is represented by a complex allophone consisting of voiceless bilabial stop and glottal stop, with labial closure initiated before glottal closure and also released before glottal release by most speakers; in some utterances there is only approach of the lips toward closure, and this is indicated here by parentheses around the symbol: /saple/ [sa^{p}'l3, sa$^{(p)}$'l3] ' a variety of bananas.'[7] (2) As first

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[4]See the note on /k^{w}/ on page 30 for discussion of the contrast between /k/ and /k^{w}/.

[5]This interpretation is critical to the analysis of LGV stops. See section 3.12113 below for a discussion of the point.

[6]The form /ak^{w}k^{w}e/ 'its opening,' might also be interpreted as /akk^{w}e/, since only /k/, not /k^{w}/, occurs unit finally at most borders, and initial members of clusters are elsewhere phonemes which may occur unit finally. The sequence /...k^{w}-s.../ has been recorded at nucleus terminal, and this is considered evidence for the interpretation in the text. For practical orthography, as discussed in Chapter IV, other spellings are better.

[7]One could interpret the data as including a cluster of glottal stop and labial stop, but this interpretation is rejected to avoid positing a unique three member cluster of glottal stop, stop and liquid; three member

member of a cluster with /s/, /p/ is represented by freely varying voiceless bilabial and labiodental fricatives [p̪, f]; the bilabial is more common: /ap sanɩ/ [...àp̪sanɩ̀, ...àfsanɩ̀] 'men who.' (3) In environments where stop and voiced fricative allophones occur as described in the general discussion above, /p/ is also represented by labiodental allophones of the same articulatory types, as uncommon free variants: /ap/ [...ap^{h}, ...a^{p}, ...a^{f} with minimally fricative labiodental] 'man'; /pete/ [p3r3, f3r3 with minimally fricative labiodental] 'two'; /apan/ [...aban, ...avan] 'unfinished.'

The phoneme /t/, besides released, unreleased or lengthened voiceless unaspirated gingival stop and voiced backward gingival flap allophones, in environments [tV], [Vt^{h}+ , V^{t}+], [VtV, Vt·V] and [VrV], as described above, is also represented by the following: (1) After /Vi/, a two part syllabic ending in /i/, the stop allophone, occurring according to the distributions given in the general discussion of stops above, is a blade articulated lamino-gingival stop [t̻]: /heitte/ [he^{i}t̻3] 'ginger'; /taitta/ [ta^{i}t̻a] 'mama (baby talk).' This allophone also occurs in cluster with lamino-gingival or lamino-palatal allophones [c̻] of other consonants: /kaintek/ [ka^{i}ñtʒ^{k}] 'important ones, brave ones.' (2) As first member of a cluster with /k/, /k^{w}/, /w/ or /j/, /t/ is represented by the voiced backward gingival flap followed by a short vocoid of the quality of the preceding vowel, indicated by a vowel symbol written above the line:[8]

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clusters do not occur otherwise. The unit cannot be interpreted as an allophone of glottal stop, for that phoneme occurs without labial closure in this environment: /a'la/[...a'la] 'inside it.' The complex unit is therefore interpreted as an allophone of /p/ even though it includes the distinctive feature of glottal stop. Parallel units do not occur for /t/ or /k/. Another case of overlap is described for /u/, for which a complex allophone including bilabial closure occurs; see section 3.12211 below.

/appot-k^{w}e/ [...apc̀r^{c}k^{w}ʒ] 'in the direction of his back'; /appʊt-k^{w}e/ [...apʊ̀r^{ʊ}k^{w}ʒ] 'in the direction of the mouth of a stream'; /nakot wa/ [nagc̀r^{c}wà] 'congratulations, younger sibling'; /hat ja/ [hàr^{a}jà] 'you (stay) here.'

The phoneme /k/, besides released, unreleased or lengthened voiceless unaspirated backed velar stop and voiced backed velar fricative allophones in environments [kV], [Vk^{h}+ , V^{k}+], [VkV, Vk·V] and [VgV], as described above, is also represented by the following: (1) As first member of a cluster with /s/, /k/ occurs as a voiceless velar fricative [x] in free variation with the normal stop allophone [k]: /hakse/ [haxsʒ, haksʒ] 'cooking pit.' (2) Preceding glottal stop which is followed by plus contour terminal without pause, /k/ is represented by velar closure in a phonetic complex of simultaneous glottal and velar closure, in free variation with the unreleased stop allophone; the complex unit is written with a hyphen after a raised stop symbol before the symbol for glottal stop [^{k}ᵀ]:[9] /mottok+ 'o halɩ hɩlɩk+ / [^{4}mct^{4}c̀^{k}ᵀ'c̀halìhɩlì^{k}, ^{4}mct^{4}c̀^{k}'c̀halìhɩlì^{k}] 'completely burning down villages.' (3) In normal conversational style, between identical vowels neither of which occurs with inherent word stress or independent secondary stress, /k/ occurs as velarization of a two mora length vocoid of the quality of those vowels, without sharp medial stricture; in deliberate style, two syllables occur separated by normal voiced fricative allophones. Velarization is written here with superscript [g] above the colon marking added vowel length: /hakasin/ [deliberately hagasin

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[8]These short vocoids contrast with full vowels. Compare the following with the examples given above: /nappot-ekken/ [napc̀rʒkʒn] 'my vertebrae'; /nappot-opa/ [napc̀rcba] 'on my back.'

[9]Contrast note 7 about a complex unit interpreted not to include /'/.

rapidly in conversation ha^{g}:sin] 'do it'; /sokou'mo/ [deliberately scgc^{up}mc, rapidly in conversation sc^{ug}:^{p}mc] 'Sogoukmo, a village name.'

For all allophones of /k/, with manners of articulation as described in the preceding paragraphs, points of articulation vary according to adjacent vowels. Following single vowels with no intervening plus contour terminal, these are as follows: (1) After /i/, /k/ occurs with fronted velar, tongue mid or back articulation, symbolized by the underlined symbol [k̲]. In this environment and immediately preceding vowels /e/, /a/ or /o/, or before /h/ or /k/ preceding those vowels, voiceless allophones of /k/ are heard with slight palatal release. This release occurs regularly before /a/ and commonly before the mid vowels. Voiced allophones of /k/ are sometimes heard with slight palatal release before /a/: /pikke, pikhe/ [pik̲ʒ, pik̲^{y}ʒ; pik̲^{h}ʒ, pik̲^{yh}ʒ] 'he or she went down'; /sikka/ [sik̲^{y}a] 'variety of gourd'; /nikho/ [nik̲^{yh}c] 'subject repeatedly walks'; /pik-a/ [pìg̲a, rarely pìg̲^{y}a] 'I shall go down (questioning).' Elsewhere after /i/ no palatal release is heard: /pik-en/ [pìg̲ʒn] 'so that I may go down'; /pik/ [pik̲] 'let me go down'; /pikin/ [pig̲ìn] 'singular subject will go down.' (2) After /ɩ/ and /e/, /k/ is produced with velar tongue back articulation, marked only in this section by superscript v: [k̲^{v}]. Examples are : /lɩlɩk/ [lɩlɩk̲^{v}] 'having gone'; /pɩkkɩ/ [pɩk̲^{v}ɩ] 'completely dead'; /appɩkɩt/ [...apɩg̲^{v}ɩ^{t}] 'term for area around the eyes'; /lek/ [lʒk̲^{v}] 'not'; /ekken/ [...ʒk̲^{v}ʒn] 'seed or flower'; /leket/ [lʒg̲^{v}ʒ^{t}] 'fence.' (3) After low vowels /k/ is produced with backed velar tongue back articulation: /nak/ [na^{k}] 'let me eat it'; /ake/ [...agʒ] 'its tail.' (4) Following round vowels /o/, /ʊ/ and /u/, /k/ is produced with backed velar tongue back articulation with simultaneous lip rounding of the same shape as for the preceding vowel. Preceding another

non-identical vowel no higher in tongue position than the vowel preceding /k/, this lip rounding is heard as a moderate labialization after the release of /k/:[10] /ok-ka/ [...ɔk^{c}a]'leaf of wild vegetation'; /ok-ken/ [...ɔk^{c}ɜn] 'seed or fruit of wild vegetation'; /pok-a/ [pɔ̀g^{c}a] 'jumping (questioning)'; /loke/ [lɔg^{c}ɜ] 'red stone used as dye'; /sukkat/ [suk^{ʊ}a^{t}] 'stick used as a tool'; /nukkɩ/ [nuk^{ʊ}ɩ]'repeatedly eating'; /puk-a/ [pʊ̀g^{ʊ}a] 'dry (questioning)' /puk-o/ [pʊ̀g^{ʊ}c] 'yes, it is dry'; /sukke/ [suk^{u}ɜ] 'baggage for a journey'; /juki/ [jug^{u}i] 'East Baliem river'; /muluk-a/ [mulʊ̀g^{u}a] 'huge (questioning)'; /muluk-o/ [mulʊ̀g^{u}c] 'yes, it is huge.' Elsewhere in this environment no labialization is heard after the release of /k/. Between identical round vowels the lip position is maintained throughout the velar closure or friction and the following vowel, and thus is not heard. Before a higher vowel, lip shape changes before release of /k/, so that no labialized release is heard: /pok/ [pc^{k}] 'jumping'; /puk/ [pu^{k}] 'dry'; /muluk/ [mulu^{k}] 'huge'; /pokot/ [pɔgc^{t}] 'sky'; /kukun/ [kugun] 'plural subject will enter'; /noko-kin/ [nɔgɔ̀gin] 'singular subject will sleep'; /lokokun/ [lɔgɔgun] 'plural subject will remain.'

Following two part syllabics /k/ occurs with points of articulation as follows: (1) After /Vi/, /k/ is produced with lamino-palatal articulation: /neik/ [he$^{i\tilde{k}}$] 'oak'; /peik-ke/ [pɛ̀$^{i\tilde{k}}$ɜ] 'awkward hand or side'; /paik/ [pa$^{i\tilde{k}}$] 'cuscus'; /poik-a, po ik-a/ [pɔ̀$^{i\tilde{g}}$a, pɔ̀ɩga] 'may I alight.' (2) After /Vu/, /k/ occurs with backed velar, tongue back articulation with simultaneous, earlier initiated bilabial closure or stricture representing /u/:[11]

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[10]For discussion of the contrast between this subphonemic labialization and /k^{w}/, see the last paragraph of this numbered section, describing /k^{w}/.

[11]See section 3.12211 below for discussion of the allophone of /u/.

/jauk/ [ja^{up}k] 'in the status of bachelorhood'; /jouk/ [jo^{up}k] 'danger or fear as of attack'; /mauke/ [ma^{ub}g3] 'periodic pig feast'; /ouk-ekke/ [...ò^{ub}g3k3] 'sickness'; symbols [^{p}k] and [^{b}g] represent the phonetic complex of bilabial closure preceding and simultaneous with backed velar closure in the preceding examples.[12]

Following plus contour terminal /k/ is produced with points of articulation corresponding to following vowels: (1) Before front vowels /i, ι, e/ /k/ in this environment is produced with velar articulation: /kin/ [^{v}kin] 'bee'; /kιkι/ [^{v}kιgι] 'I went in'; /keka/ [^{v}k3^{v}ga] 'they went in.' (2) Before central and back vowels /a, o, υ, u/, /k/ in this environment occurs with backed velar articulation: /ka/ [ka] 'where'; /koko/ [kcgc] 'we went in'; /kυkυn/ [kυgυn] 'don't go in (singular subject)'; /kukun/ [kugun] 'plural subject will go in.'

The phoneme /k^{w}/, besides voiceless unaspirated backed velar stop and voiced backed velar fricative allophones, both including strong vocoid labialization, in environments [k^{w}V], [Vk^{w}V, Vk^{w}·V] and [Vg^{w}V] as described in the introductory section on stops above, is also represented in all environments where it occurs by a less common freely variant allophone with lenis labiodental labialization; this variant apparently does not occur in all idiolects: /k^{w}e, ke/ [k^{w}3, k^{v}3; k3] 'trail'; /ak^{w}e, ake/ [...ag^{w}3, ...ag^{v}3; ...ag3] 'his wife.' As first member of a cluster with /s/, /k^{w}/ occurs with voiceless labiodental fricative labialization: /lιak^{w}-sιlιkhe/ [lιàk^{f}sιlιk^{h}3] 'having put it up.' All allophones of /k^{w}/, with manners

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[12] The occurrence of /k/ unit finally after /Vi/ and /Vu/, when those two part syllabics are not followed by another consonant, is automatic in LGV. Some of these forms have correspondences with final /k/, some with final vowel, elsewhere. Sequence /aik/ is most widespread. Compare BV /u/, LGV /ouk/ 'sickness'; BV /pι/, LGV /heik/ 'oak'; BV, LGV /aik/ 'his tooth.'

of articulation as described, occur at points of articulation corresponding to adjacent vowels with the pattern described for /k/, above. The very limited distribution of /k^w/ greatly limits that phoneme with regard to the number of points of articulation at which allophones occur as compared with /k/:[13] /k^we, ke/ [$\overset{yw}{k}$ɜ, $\overset{y}{k}$ɜ] 'trail'; /ak^{w}k^{w}e, akke/ [...ak^{w}ɜ, ...akɜ] 'its opening.'[14]

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[13]The phoneme /k^w/ occurs only word initially and medially, only before vowels /e/ and /ɩ/, and only following /a/ word medially.

[14]The labialization of /k^w/ contrasts in quality, and the labialized unit in distribution, with labialization of /k/ after rounded vowels. The first fact to be noted is that /k/ and /k^w/ contrast. Although all items in which /k^w/ is heard also occur with /k/, many items have only /k/, never /k^w/, in the same or analogous environments. Compare with the illustrations in the text the following: /ket/ [kɜ^t] 'new'; /kem/ [kɜm] 'variety of grass'; /ake/ [...agɜ] 'its tail.' Further, this contrast cannot be assigned to contrast of /k/ with a cluster of /k/ with /w/ or a sequence of /k/ and a rounded vowel. The interpretation of [k^w] as /k/ plus /w/ is rejected because it posits the occurrence of a consonant cluster following silence or plus contour terminal, where no consonant clusters are otherwise observed to occur. Interpretation of [k^w] as /k/ plus /u/ or /ʊ/ or /o/ is rejected as not squaring with the phonetic data, for these vowels are always fully syllabic preceding another vowel: /luppuet/ [lupuɜ^t] 'ingressive whistle'; /sue/ [sʊɜ] 'bird'; /noe/ [noɜ] 'my older sibling.' Informants can produce without hesitation the hypothetical parallel forms: */kue/ [kuɜ]; */kʊe/ [kʊɜ]; /koe/ [koɜ]. The phonetic item [k^w] is therefore interpreted as /k^w/, a unit phoneme in contrast with /k/.

It is further observed that allophones of /k^w/ are in complementary distribution with the labialized velar allophones of /k/ following rounded vowels. Assignment of those latter allophones to /k^w/ is rejected for the following reasons: (1) The allophones in question are also in complementary distribution with non-labialized allophones of /k/, which are in contrast, as discussed above, with /k^w/. (2) The labialization of those allophones of /k/ following rounded vowels is easily interpreted as environmentally conditioned, but the phonetically different labialization of allophones here assigned to /k^w/ cannot be so interpreted; note that /k^w/ may follow silence and precedes unrounded vowels, but the allophones in question only follow round vowels. (3) Assignment of the allophones in question to /k^w/ would leave that phoneme still limited in range of distribution, not occurring word or contour finally and not occurring following front vowels, and would give /k/ a uniquely limited range of distribution, occurring following front and central vowels but not back vowels before front and central vowels, and not after /u/ before /o/. Assignment of labialized velar allophones following rounded vowels to /k/ gives that phoneme distribution before and after all vowels, parallel with the distributions of /p/ and /t/.

3.12112 <u>Voiceless continuants</u> /s, h/. The voiceless continuants /s/ and /h/ are correspondences of allophones of PD */p/, */t/, */k/, */k^{w}/ and /β/.

The phoneme /s/ is a voiceless sibilant principally represented by lamino-alveolar allophones with comparatively flat tongue shape, flatter than for English /s/: /lese/ [l3s3] 'long combined pig and dwelling house.' In phonetic cluster with an allophone of /l/, /s/ is represented by an allophone with slight lateral release, here symbolized by superscript [^{l}]: /el salek/ [...ɜ̀^{d}ls^{l}alɜ̀^{k}] 'sugar cane, mistakenly'; /hina'nesi lan/ [Nn̥a'nɜs^{l}ɪ̀:àn] 'go get (water) for me.' Following /i/ and preceding vowels /e/, /a/ or /o/, a lamino-alveopalatal allophone of /s/ occurs, indicated by superscript tilde [s̃]: /isa/ [...is̃a] 'large one with smaller ones, as of a thumb or a sow'; /kiselek/ [kis̃ɜlɜ^{k}] 'severed from the stalk (of bananas)'; /hep-isokotek/ [hɜ̀bis̃cgcrɜ^{k}] 'we neglect it.' Following /u/ and preceding /e/, /a/ or /o/, the palatalized allophone described above occurs as a free variant, more common in some idiolects than others, with the alveolar allophone: /huse/ [husɜ, hus̃ɜ] 'species of cuscus'; /hipusa/ [hibusa, hibus̃a] 'species of bird'; /appusok/ [...apusc^{k}, ...apus̃c^{k}] 'its chip.'

The phoneme /h/ is a voiceless continuant principally represented by voiceless vocoid allophones of the quality of the following vowel; these are indicated by upper case vowel letters: /hit/ [Ii^{t}] 'you (plural)'; /hat/ [Aa^{t}] 'you (singular)'; /hʊk/ [Uʊ^{k}] 'wrong'; /hule/ [Uul̃ɜ] 'smoke rising from a village.'[15] In phonetic cluster with /m/, /n/, /ŋ/ or /l/, the phoneme

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[15]These allophones of /h/ are not symbolized but are to be assumed in other places where /h/ occurs and another allophone is not indicated.

/h/ is represented by a voiceless counterpart of the other cluster member, indicated here by upper case symbols for nasals and [ɬ] for the lateral: /wam-he/ [wàmM3] 'pig (with connective morpheme)'; /wanhi/ [wanNi] 'I took it'; /saŋ-he/ [sàŋN3] 'type of bark container (with connective morpheme)'; /loilha/ [lc^{id}ɬa] 'they burned it up'; /kain-he/ [kà^{i}ñN3] 'brave (with connective morpheme).' As the second member of a cluster with stops, /h/ occurs as aspiration of the preceding stop: /japha, jappa/ [jap^{h}a, japa] 'they fought'; /watha, watta/ [wat^{h}a, wata] 'they hit him'; /nikho/ [nik^{yh}c] 'subject repeatedly walks.' The labialized velar /k^{w}/ does not occur in this last environment.

3.12113 Stops and voiceless continuants as correspondences of PD stops. In section 2.7 of Chapter II, it was indicated that LGV had only one set of stops /p, t, k, k^{w}/ and two voiceless continuants /s, h/ as the major correspondences of the voiced, aspirate and implosive stop series of PD. Phonemes /s/ and /h/ correspond to word initial and some other occurrences of PD aspirate stops and the PD labial implosive, and the LGV stop series corresponds to the other occurrences of PD aspirate stops and all occurrences of PD voiced stops.

The principal sets of phones involved are: word initial [p], [t], [k], [k^{w}] corresponding to word initial PD */b/, */d/, */g/ and */g^{w}/; plus contour span final [p^{h}, p], [t^{h}, t], [k^{h}, k] corresponding to the probably very similar final allophones of PD */p/, */t/ and */k/; intervocalic [ɓ], [r], [ɠ], [ɠ^{w}], the first of which corresponds to intervocalic PD */β/ and */p/, and the others of which correspond to very similar intervocalic allophones of PD */t/, */k/ and */k^{w}/; intervocalic [p, p·], [t, t·], [k, k·], [k^{w}, k^{w}·] corresponding in many cases to intervocalic PD */b/, */d/, */g/ and */g^{w}/,

but also to intervocalic PD */pp/, */tt/, */kk/, */$k^{w}k^{w}$/; intervocalic [p^{h}], [t^{h}], [k^{h}], corresponding to PD */pp/, */tt/, */kk/ or to PD heterorganic clusters of aspirate stops; morpheme initial [h], corresponding to morpheme initial PD */p/, */k/, */k^{w}/ and */β/; morpheme initial and medial [s], corresponding to PD */t/ and in some cases to PD */j/. Morpheme initially and medially, /l/ corresponds to PD */δ/ and PD */l/.

The initial phones described are all in contrast with each other: /pok/ [pc^{k}] 'jumping'; /puk/ [$pʊ^{k}$] 'dry'; /tok/ [tc^{k}] 'arrow'; /kok/ [kc^{k}] 'big'; /hom/ [hcm] 'kladdi, taro'; /huk/ [$hʊ^{k}$] 'wrong'; /som/ [scm] 'bank'; /suk/ [$sʊ^{k}$] 'mushroom.' The final phones described are also all in contrast with each other; /sep/ [$sɜp^{h}$, $sɜ^{p}$] 'pertaining to a joint'; /set/ [$sɜt^{h}$, $sɜ^{t}$] 'out of breath'; /sek/ [$sɜk^{h}$, $sɜ^{k}$] 'verb suffix.' The voiced intervocalic phones are in contrast with each other: /hɪpɪ/ [h ɸɪ] 'dry weather'; /epe/ [...ɜbɜ] 'his, her, its presence'; /ɪtɪk/ [...ɪrɪ^{k}] 'species of cuscus'; /pete/ [pɜrɜ] 'two'; /hɪkɪ/ [hɪgɪ] 'I put it down'; /eke/ [...ɜgɜ] 'her co-wife'; /ake/ [...agɜ] 'its tail'; /ake, ak^{w}e/ [...agɜ, ...ag^{w}ɜ] 'his wife'; /hele/ [hɜlɜ] 'tying material.'

Besides those contrasts, which are paralleled in PD, [s] also contrasts with [r]: /esake/ [...ɜsagɜ] 'torch'; /etake/ [...ɜragɜ] 'his, her, its lung'; /wesa/ [wɜsa] 'taboo'; /meta/ [mɜra] 'when.' In compounds and proper NGV names, although not in single morphemes, [h] contrasts with [g]: /wesahe/ [wɜsahɜ] (from /wesa/ plus /he/) 'spirit medium'; /esake/ [ɜsagɜ] 'torch'; /wenakohe/ [wɜnagchɜ] (from /wenako/ 'counted' plus /he/) 'Counted-woman (a name)'; /lokɛ/ [lcg^{c}ɜ] 'stone used for reddish dye.'

The sets [h] and final [p^{h},^{p}]; [r] and final [t^{h}, ^{t}]; [g] and final [k^{h}, ^{k}] are in complementary distribution within each set. The various

allophones of /h/ are also in complementary distribution with all of the final stop allophones. If compounds and proper names were excluded, as they cannot be, /h/ would also be in complementary distribution with [ɡ]. Initial [p], [t], [k], [k^w] are also in complementary distribution with intervocalic [b], [r], [ɡ] and [$ɡ^w$] respectively, and with the occurring final phones [p^h, p], [t^h, t] and [k^h, k], respectively. Initial stops are in complementary distribution with intervocalic [p, p·], [t, t·], [k, k·] and [k^w, k^w·].

At first glance the intervocalic voiced phones appear in contrast with the intervocalic stops: /apput/ [...apu^t] 'his son'; /aput/ [...abu^t] 'his, her, its stomach'; /etto/ [...ɜtc] 'laugh'; /eto/ [...ɜrc] 'main part or source'; /okko/ [...ckc] 'price'; /oko/ [...cgc] 'we said'; /akke, ak^{w}k^{w}e/ [...akɜ, ak^{w}ɜ] 'its entrance'; /ake, ak^{w}e/ [...aɡɜ, aɡ^{w}ɜ] 'his wife.'[16] Three facts, however, lend pressure to interpreting the intervocalic stops as geminate clusters: (1) Perceptible phonetic length may occur as a freely varying modification of these stops. (2) Some of these LGV intervocalic stops correspond to geminate clusters of aspirate stops in PD and other extant dialects: /tukke, tukhe/ [tuk^{u}ɜ, tuk^{uh}ɜ] 'species of pandanus,' from PD */dukke/. (3) This interpretation gives fewer phonemes of wider distribution. Establishing /h/ as a separate phoneme from /p/, /t/, /k/ and /k^w/ permits analysis of intervocalic aspirated stops as stop plus /h/, intervocalic unaspirated stops as stop plus stop, and intervocalic voiced fricatives and flap as stop. This is not possible in any other dialect thus far studied.[17]

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[16]The intervocalic stops all occur with alternate added length. This is to be assumed, as noted in section 3.12 above.

No alternative solution is as attractive as describing /h/ and /s/ as separate phonemes and /p, t, k, k^w/ as a single set of stops. Allophones of /h/ and /s/ might be included in the same phonemes with final allophones [k^h, k] and [t^h, t] respectively, but this would leave the new phonemes with no structurally parallel labial phoneme. It would also separate from the proposed phonemes the voiced intervocalic allophones [r] and [ɣ], which are members of the same phonemes as the final stops in all dialects surveyed. Everywhere these two sets alternate in the single commonest phonetic alteration of forms of morphs in the language, so that to separate them necessitates setting up two allomorphs for every stop-final morpheme in the lexicon. The proposed solution would follow comparative and historical data in uniting allophones of /h/ and /s/ with some allophones of /k/ and /t/, but it would be forced to violate those types of data in excluding the voiced intervocalic allophones from the phonemes proposed and, like the descriptive solution adopted in this study, in failing to distinguish the correspondences of LGV /h/ to PD */p/, */k^w/ and */β/ as well as */k/.

At an earlier stage of the analysis, the intervocalic voiced allophones [b], [r], [ɣ], [$ɣ^w$] were interpreted to constitute separate phonemes, because of the apparent contrast of those phones with intervocalic stops. This description, like that rejected in the preceding paragraph, separated those voiced phones from the final stops. Interpreting intervocalic stops as geminate clusters makes this unattractive possibility unnecessary.

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[17] In AV there are five intervocalic series of phones, e.g. the gingivals [t], [t^{sh}], [t^h], [r] and [s]. The first two and the last occur in contrast word initially; all apparently contrast intervocalically. They are interpreted as intervocalic occurrences of AV /d/, /tt/, /tk/, /t/ and /s/, respectively. In LGV initial [s] and medial [t] replace AV [t^{sh}] so that the intervocalic correspondences of AV [t^{sh}] and [t] coincide phonetically.

In the practical orthography to be described in Chapter IV, compromise is made with the structure of other dialects by a principle which generally symbolizes stop allophones which are correspondences of PD voiced stops separately from those which are correspondences of PD aspirate stops. That is a practical, alphabetic treatment, however. The phonetic and distributional data point squarely to the phonemic pattern outlined here for LGV, one markedly non-congruent with the patterns of PD and other dialects.

3.1212 Liquids /m, n, ŋ, l/. The liquids, consisting of bilabial, gingival, and back velar nasals and a gingival lateral, are all voiced.[18]

The phoneme /m/ is represented in all environments where it occurs by a voiced labial nasal, nearly always bilabial but very rarely labiodental; the latter is indicated by symbol including subscript comma [m̪]: /mo/ [mc, very rarely m̪c] 'sun'; /eme/ [...ɜmɜ, very rarely ɜm̪ɜ] 'come here'; /wam/ [wam, very rarely wam̪] 'pig.'[19]

The phoneme /n/ is principally represented by a voiced gingival nasal allophone: /nan/ [nan] 'eat it'; /ane/ [...anɜ] 'his, her, its noise'; /an/ [...an] 'I, me.' In the following environments /n/ is represented by a lamino-gingival allophone [ñ]: (1) Following the sequence /hi/ or /'i/ or a word initial /i/ and preceding any vowel other than a high front vowel, a lengthened and syllabic lamino-gingival nasal occurs representing the sequence of phonemes /in/: /hinet/ [hiñn̪ɜ^{t}] 'sharp pain'; /+ 'inek/ ['ñ:ɜ^{k}] 'let him say it'; /+ 'in-o/ ['ñ:c] 'yes, say it'; /+ 'inupuluk/ ['ñ:ʊʙʊlʊ^{k}] 'their tracks'; /+ 'appunɨ inatɨk/ ['apunɨñ:arɨ^{k}] 'killing

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[18] Voiceless liquids are allophones of /h/; see section 3.12112 above.

[19] For various phonetic sequences including [m] and representing /m/ and a vowel phoneme, see sections 3.12211 and 3.12214 below.

people.' (2) In fast speech the sequence /nin/ occurs both as [n:^{i}][20] and as [nn̄:]: /ninom/ [deliberately ninom; faster n:^{i}m, nn̄:m] 'we together.' (3) Following /Vi/, a two part syllabic, frequently the vowel glide toward /i/ is scarcely heard, so that [ñ] represents the sequence of phonemes /in/: /hein/ [he^{i}ñ, heñ] 'put it down'; /kain/ [ka^{i}ñ, kañ] 'brave, wealthy, generous'; /hoina/ [hc^{i}ña, hcña] 'crayfish.' (4) In phonetic cluster with a palatalized or laminal allophone of another consonant, the lengthening and palatalization of /n/ and the other consonant represent the vowel /i/: /wani lan/ [slowly wanì làn; faster wañ:ɪ̀:àn] 'go get it.'[21]

The phoneme /ŋ/ is principally represented by a voiced back velar nasal allophone: /saŋ, san/ [saŋ, san] 'type of bark container.' The points of articulation of allophones of /ŋ/ correspond to preceding vowels as follows: (1) Following /ɪ/ and /e/ velar allophone [^{v}ŋ] occurs: /nɪŋ, nɪn/ [nɪ^{v}ŋ, nɪn] 'tight, fast'; /heŋ-sek, hen-sek/ [hɜ̂^{v}ŋsɜ^{k}, hɜ̂nsɜ^{k}] 'protruding (as of the tongue).' (2) Following /a/ and /o/ the back velar allophone occurs: /selaŋ, selan/ [sɜlaŋ, sɜlan] 'loose'; /huoŋ, huon/ [hucŋ, hucn] 'variety of bark container.'[22]

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[20] See section 3.12214 below.

[21] The reasoning here is not circular. The range of allophone [ɪ] of /l/ is described in terms not including occurrence after [ñ] in this case.

[22] The phoneme /ŋ/ has not been recorded following /i/ or /u/ in local words. Note that many forms like /nan/[nan] 'eat it' occur only with /n/, never with /ŋ/; these contrast with forms occurring with /ŋ/, all of which also occur with /n/ in LGV. Compare the /k/ - /k^{w}/ contrast. These facts and the limited distribution of /ŋ/, which does not occur word initially, as second member of clusters nor after /i/ or /u/, mark the /n/ - /ŋ/ contrast as one of minimal functional load. Perhaps it is being lost, as seems much more likely, or currently being borrowed from dialects like GD, where /ŋ/ has distributional range parallel to that of /n/.

The phoneme /l/ is principally represented by voiced gingival lateral [l]: /nele/ [n3l3] 'I should have eaten, am hungry'; /mola/ [mcla] 'light colored.' Before plus contour terminal or as first member of a cluster with a stop, /s/, /h/ or a nasal, /l/ occurs as a very lightly affricated gingival lateral [^{d}l]: /3l+ / [...3^{d}l] 'sugar cane'; /el kok/ [...3^{d}lkc^{k}] 'big sugar cane'; /alme/ [...a^{d}lm3] 'back tooth'; /el salek/ [...3^{d}ls^{l}al3^{k}] 'sugar cane mistakenly'; /el ha/ [...3^{d}l+à] 'in exchange for sugar cane.' In the following environments /l/ is represented by a lamino-gingival allophone [l̆]: (1) Following /i/ and preceding /e/, /a/ or /o/, a lengthened lamino-gingival allophone occurs with syllabicity in some idiolects, representing the sequence of phonemes /il/: /pile/ [pil̆3, pl̆:3] 'I should have gone down'; /kila/ [kil̆a, kl̆:a] 'a species of bird'; /pilo/ [pil̆c, pl̆:c] 'we should have gone down.' (2) Following /Vi/, a two part syllabic, frequently the vowel glide toward /i/ is scarcely heard, so that the lamino gingival [l̆] occurring there represents the sequence of phonemes /il/: /heil/ [he^{id}l̆, he^{d}l̆] 'split-stick tongs'; /sail/ [sa^{id}l̆, sa^{d}l̆] 'cowries, belts of cowries'; /hoil/ [hc^{id}l̆] 'cowardly.' (3) Following the sequence /Vi'/, the lamino-gingival [l̆] occurs in some idiolects: /ai' lek/ [...à^{i}'l̆3^{k}, ...à^{i}'l3^{k}] 'not hot.' (4) Following /u/ and preceding /e/, /a/ or /o/, the lamino-gingival [l̆] occurs in some idiolects as a free variant with the gingival allophone; in other idiolects it occurs regularly there. In some idiolects the allophone [l̆] frequently occurs there before /e/ and /o/ but rarely before /a/: /pulelhatek/ [pul̆3^{d}l+ar3^{k}, pul3^{d}l+ar3^{k}] 'they regularly turn it over'; /wul-a/ [wùl̆a, wùla] 'ashes (questioning)'; /pulok/ [pul̆c^{k}, pulc^{k}] 'extinguished (of tinder).' (5) In some idiolects the lamino-gingival allophone [l̆] occurs following the sequence /Vu'/: /na'mou'-lak/ [na'mɔ̀^{u}'l̆a^{k}, na'mɔ̀^{u}'la^{k}] 'my friends.'

(6) In phonetic cluster with a laminal allophone of another phoneme, the lamino-gingival allophone [I] occurs: /kain lek/ [kà^{i}nI^{k}] 'not brave.'

3.1213 Glottal stop /'/. Glottal stop is represented in all environments where it occurs by a glottal stop, with lip and tongue position for the preceding vowel maintained through the stop: /a'ɩt/ [...a'ɩ^{t}] 'his dislike'; /na'mou'-lak/ [na'mò^{u}'Ia^{k}, na'mò^{u}'la^{k}] 'my friends'; /ai' lek/ [...à^{i}'I^{k}, ...à^{i}'l^{k}] 'not hot.'[23]

3.1214 Consonantal vocoids /w, j/. The consonantal vocoids are voiced high close tense presyllabic vocoids.

The phoneme /w/ is principally represented by a voiced high close tense back rounded vocoid: /wa/ [wa] 'greeting of congratulation.' Before /u/, /w/ is represented by an unrounded allophone, written here with the symbol [w]: /wul/ [w^{d}ul] 'ashes.'

The phoneme /j/ is represented in all environments where it occurs by a voiced high close tense front unrounded vocoid: /jɩ/ [jɩ] 'this'; /jake/ [jag3] 'stone adze'; /najuk/ [naju^{k}] 'my fear.'[24]

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[23]Glottal stop is treated throughout this study separately from other stops for two reasons. First, on the synchronic level, it is distributed differently from other stops. Second, comparative data indicate that it has an origin very different from that of the other stops. This phoneme is in some dialects of Dani lexically contrastive in only a very few forms, principally the word /a'ɩt/ 'his dislike,' and some proper names like the LGV name /jano'e/ [janc'3] 'Janoe (name of unknown meaning).' In LGV the substitution of glottal stop for /k/ and many occurrences of /t/ as first member of a cluster with liquids produced a few additional contrasts. It appears that in proto-Dani glottal stop was a junctural or terminal phenomenon which perhaps became morpheme medial in /a'ɩt/ when an old sequence of two items with plus terminal border between them became fused. With this contrast introduced, even though it has a very light functional load, a synchronic analysis is forced to recognize glottal stop as phonemic wherever it occurs, even in association with contour onsets and terminals. A practical orthography needs to symbolize only contour medial occurrences, and a cross-dialect practical orthography needs to mark only intervocalic occurrences.

3.122 Vowels. All syllabic vocoids and post-syllabic vocoid glides toward /i/ and /u/ are vowels. Syllabic vocoids with no offglide of those sorts are single vowels; syllabic vocoids including such offglides are two part syllabics.

3.1221 Vowel phonemes. Most of the phonetic data concerning vowels may be described as involving allophones of particular vowel phonemes.

3.12211 High close vowels /i, u/. The high close vowels are principally represented by voiced high close tense vocoid allophones. The high close front unrounded vowel occurs principally as a backed high close front unrounded vocoid written here as [i]:[25] /i/ [...i] 'water'; /appikit/ [...apigi^{t}] 'his flea'; /tuki/ [tu^{g}^{u}i] 'moon.' Following back velar allophones of /k/, /i/ is represented by an allophone with centralized onset,

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[24]The interpretation of some sequences as including or not including /j/ and /w/ is still problematical. Two vowels occur in sequence with no consonant between them: /kaɪn/ [kaɪn] 'species of pandanus'; /laet/ [la3^{t}] 'shrub with spicy leaves'; /la-ok/ [lɑ̊c^{k}] 'women's greeting.' These sequences would appear to be evidence for interpreting [uV], [ʊV] and [oV] as not including intervocalic /w/, and sequences [iV], [ɪV] and [eV] with no intervocalic /j/. Informant reaction favors this interpretation in the cases of /ʊV/, /oV/, /ɪV/, and /eV/, for local speakers will not accept a pronunciation of these sequences with a presyllabic [j] or [w] before the second vowels, even though the first vowels of sequences /ea/ and /oa/ often are heard with postsyllabic offglide: /lɪa/ [lɪa, but not *lɪja] 'light'; /lʊok/ [lʊc^{k}, but not *lʊwc^{k}] 'let's go'; /weak/ [we^{ɪ}a^{k} but not *weja^{k}] 'bad'; /oak/ [...o^{ʊ}a^{k} but not *owa^{k}] 'bone.' These sequences may be interpreted then as simple two-vowel clusters wherever they occur. However, informants react differently with regard to [iV] and [uV] sequences; when asked to syllabify words including these sequences, they produce a second syllable with initial /j/ after /i/ and /w/ after /u/, and they accept these pronunciations: /uwe/ [u3, ...uw3] 'Uwe river.' Tentatively, the sequences [iV] and [uV] are interpreted as representing sequences /ijV/ and /uwV/. Another problem involving /j/ occurs in the sequence heard in /ajʊk/[...aju^{k}] 'his fear.' Earlier this form was interpreted as */aiʊk/, but it now appears probable that no two part syllabics occur in LGV without a following consonant other than /j/ or /w/, and that this consonant is recognizable by friction absent in the form under discussion. Informants forced to syllabify produce the form as [...a.ju^{k}].

[25]Note that /i/ is closer to /u/ than /ɪ/ is to /ʊ/.

although this is much less pronounced in LGV than in other Grand Valley dialects; this allophone is here indicated by a hyphen preceding the vowel symbol [-i]: /lokokin/ [lɔgɔg-in] 'singular subject will stay.' As the second member of two part syllabics, /i/ is represented by a non-syllabic vocoid glide toward /i/ and/or by a simultaneous component of a phonetically complex unit representing the vowel plus the following consonant. Before /t/, /k/, /s/, /n/ or /l/, this component is the palatal or laminal feature of the lamino-gingival, lamino-alveolar and lamino-palatal allophones of those phonemes as already described. Before /m/ this component is simultaneous [i] timbre with [m]:[26] /neittep/ [ne^{i}t̻ɜ^{p}] 'my knee'; /peik-ke/ [pè^{i}k̻ɜ] 'awkward hand or side'; /paik ake/ [pà^{i}g̃agɜ̀] 'cuscus tail'; /heise/ [he^{i}s̃ɜ] 'sneeze'; /hein/ [he^{i}ñ] 'put it down'; /sail/ [sa^{id}l̻] 'cowries'; /weim/ [we^{i}m^{i}] 'battle.' Following /h/ or /'/ and preceding /m/, /n/ or /l/ before vowels lower than /i/, /i/ occurs as lengthening and palatalization of /n/ and /l/ and as lengthening and [i] timbre with /m/; preceding /m/ this allophone varies freely with the normal vocoid allophone: /+ 'ima/ ['m̻^{i}:a, 'ima] 'in the water'; /+ 'inom/ ['ṇ:cm] 'they together'; /hine/ [Ñṇ:ɜ] 'phlegm'; /+ 'ilep/ ['l̻:ɜ^{p}] 'he or she should have said it.' In fast speech this type of allophone also occurs following liquids and /s/, with the rest of the environment as stated above: /wani lan/ [fast wañ:l̻̀:àn] 'go get it'; /pali lan/ [fast pal̻̀::àn] 'go cut it off'; /hina'nesi lan/ [fast Ñña'nɜs^{l}l̻̀:àn] 'go get (water) for me.'[27]

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[26] The possibility of recognizable or contrastive timbre for a nasal has been questioned, but it is reported also by Trager and Smith, Outline of English Structure (Studies in Linguistics Occasional Papers No. 3. Norman, 1951) p. 41. In reference to this report--albeit the reference is skeptical-Pike proposes an analysis identical to that proposed here for LGV Dani. Kenneth L. Pike, op. cit., part II, p. 48, fn.

[27] For other similar allophones of /i/, see section 3.12214 below.

The phoneme /u/ is principally represented by a voiced fronted high close tense back vocoid, with closed flat lips except for a central flat lip opening in some idiolects and a central tightly rounded lip opening in other idiolects; the underlined symbol indicates flat lip shape: /su/ [su, s̲u] 'net'; /apput/ [...apu^{t}, ...ap̲u^{t}] 'his son'; /tuki/ [tu^{u}i, t̲u^{u}i] 'moon.' As the second member of two part syllabics, /u/ is represented by a non-syllabic vocoid glide toward /u/ and by a simultaneous component of a phonetically complex unit representing the vowel plus the following consonant. Before glottal stop this component is simultaneous lip and tongue position as for /u/; before /m/ the component is simultaneous [u] timbre with [m]; and before /k/ the component is labialization of unique sort. Frequently this labialization is a voiceless bilabial stop before a stop allophone of /k/ or a voiced bilabial fricative before a voiced fricative allophone of /k/; either the stop or the fricative is initiated slightly before and maintained through most or all of the velar closure. Rare utterances of most informants and regular utterances of a few include a normal vocoid allophone of /u/ with no bilabial closure or friction: /na'mou'-lak/ [na'mò^{u}'^{u}lak] 'my friends'; /haum/ [ha^{u}m^{u}] 'whole (of eating a piece of food'; /kouk/ [ko^{up}k, ko^{uk}] 'raft'; /kouk-a/ [kò^{ub}g^{u}a, kò^{u}g^{u}a] 'raft (questioning).'[28] Adjacent to a bilabial consonant in a syllable which does not begin a contour group, or elsewhere in a syllable adjacent to a syllable of that sort, /u/ in fast speech is represented by lengthening and syllabicity of the bilabial consonant; in the case where /u/ is

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[28]This analysis is preferred because: (1) The bilabial stricture does not occur invariably; the velar stricture does. (2) The bilabial stricture is phonetically similar to features of /u/, which occurs in all these cases; it can be interpreted as conditioned by the environment; the velar stricture cannot. (3) Some of these forms are cognate with forms in other dialects

adjacent to /m/, simultaneous [u] timbre also occurs:[29] /makkum/ [makum, faster makɱ:^{u}] 'originally'; /tumut-han/ [tumùt^{h}an, faster tɱ̀:^{u}:t^{h}an] 'do it hard'; /amulok/ [...amulɔ̃c^{k}, faster ...am:lɔ̃c^{k}] 'flame'; /humusɜ/ [humusɜ^{k}, faster Mɱ:^{u}:sɜ^{k}] 'running'; /appumeak/ [...apumea^{k}, faster ...apɱ:^{u}ea^{k}] 'very thick'; /hamakappu nekein/ [greeting frozen in fast style hama:^{ɐ}p̩ɜ̀n3ɡè^{i}ñ] 'cordial greeting (meaning singular subject will eat your anus)'; /hopuk/ [hcɒu^{k}; rarely, in fast style hcɒ̀:^{k}] 'later'; /ilu' muluk/ [...ilù'mulù^{k}, faster, possibly with stylistic modification ...il:̀'m:^{l}:̀^{k}, with bilabial closure through all syllables after the first] 'huge.'[30]

3.12212 High open vowels /ɩ, ʊ/. The vowel /ɩ/ is principally represented by voiced high open tense front unrounded vocoids, noticeably closer and more tense than the English vowel in 'pin': /ɩ/ [...ɩ] 'yes'; /jɩ/ [jɩ] 'this'; /nɩkkɩ/ [nɩkɩ] 'I ate it'; /appɩkɩt/ [...apɩɡɩ^{t}] 'the area around the eyes for cosmetic decoration.'[31]

The vowel /ʊ/ is principally represented by voiced high open tense back rounded vocoids, noticeably closer and more tense than the English vowel in 'book': /sʊ/ [sʊ] 'incantation word in healing rites'; /appʊt/ [...apʊ^{t}] 'lower reaches of a stream'; /tʊkɩ/ [tʊɡ^{ʊ}ɩ] 'club.'

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with final /k/; none is represented elsewhere with final /p/: LGV /touk/, BV /dʊk/ 'species of bananas.' (4) The analysis parallels the analysis of /k/ after two part syllabics with final /i/, where no other type of stricture occurs. Note that an analysis of the complex unit as representing a consonant cluster would posit a cluster word finally, where none occur otherwise.

[29]Analysis of stylistic modifications is incomplete, but is referred to on a tentative basis in the illustrations. Note that the environment specified includes syllables where /u/ is not adjacent to a bilabial but where a preceding or following syllable not contour-initial includes /u/ adjacent to a bilabial; it also includes contour initial syllables preceding syllables including /u/ adjacent to a bilabial consonant.

[30]This last form appears to be differently modified from the others.

3.12213 Mid vowels /e, o/. The vowel /e/ is principally represented by mid open front unrounded vocoids: /e/ [...ɜ] 'exclamation of hunger'; /leket/ [lɜgɜ^{t}] 'fence.' Following back velar allophones of /k/ in closed syllables, /e/ is represented by a centralized allophone indicated by a hyphen after the symbol [ɜ-], and in this environment in open syllables, /e/ is represented by an allophone with centralized onset, indicated by a hyphen before the symbol [-ɜ]: /hesakel/ [hɜsagɜ-^{d}l] 'star'; /lɩpaken/ [lɩbagɜ-n] 'across the stream'; /ettake/ [...ɜtag-ɜ] 'his, her, its name.' As first member of the two part syllabic /ei/, /e/ is represented by the mid close allophone [e]: /heil/ [he^{id}l] 'split-stick tongs.' Regularly preceding an /l/ before a vowel higher than /e/, and as a free variant preceding /l/ before /o/, /e/ is represented by the mid close allophone [e]: /helu/ [helu] 'your knowledge'; /eloma/ [...elcma, ...ɜlcma] 'over there (at a distance).' Before /a/, /e/ is represented by a slightly raised or mid close allophone with or without an upward vocoid offglide, which is never syllabic or syllabified with the following vowel, and which is not present in slow, deliberate speech: /weak/ [we^{ɩ}a^{k}, deliberately wea^{k}] 'bad.'[31]

The vowel /o/ is principally represented by mid open back rounded vocoids: /o/ [...c] 'wood, house, village'; /appot/ [...apc^{t}] 'his back.' As first member of the two part syllabic /ou/, /o/ occurs as a mid close back rounded vocoid [o]: /souk/ [so^{up}k] 'door for closing doorways.' Preceding /a/ and /e/, /o/ occurs as the mid close allophone with or without an upward offglide, which is never syllabic or syllabified with the following vowel, and which is not present in slow, deliberate speech:

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[31]For other allophones see section 3.12214 below.

/oak/ [...o$^{\upsilon}$a^{k}, deliberately ...oa^{k}] 'his, her, its bone'; /oe/ [...o$^{\upsilon}$ɜ, deliberately ...oɜ] 'his, her, its older sibling.'[32]

3.12214 Non-vocoid allophones of front vowels in fast speech. In fast speech any front vowel, /i/, /ɪ/ or /e/, between identical liquids /m/, /n/ or /l/ may occur represented by freely variant allophones consisting of length, syllabicity and vowel timbre with the liquid involved: /wete'ma-nen/ [wɜrɜ'mànɜn, fast wɜrɜ'màn^{e}:] 'after it was thus'; /anini/ [...anini, fast ...an^{i}:i] 'his vigor'; /pilili/ [pilili, fast pil^{i}:i] 'running'; /wulɪlɪmo/ [wulɪlɪmc, fast wul^{ɪ}:ɪmc] 'Wulilimo (name of unknown meaning)'; /alelalek/ [...alɜlalɜ^{k}, fast ...al^{e}:alɜ^{k}] 'Alelalek (name of unknown meaning).' In fast speech a front vowel occurring between /l/ and /'/ may occur similarly represented by freely variant allophones consisting of length, syllabicity and vowel timbre of /l/: /hɪlɪ' laɪ/ [hɪlɪ'laɪ, fast hɪl^{ɪ}:'laɪ] 'they are putting it down'; /esokpale'lek/ [...ɜsc^{k}pal^{e}:'lɜ^{k}] 'Esokpaleklek or Foot-not-cut (name normally pronounced in fast style).'

3.12215 Central vowel /a/. The vowel /a/ is represented in all environments where it occurs by low close fronted central vocoids: /a/ [...a] 'sexual intercourse'; /wa/ [wa] 'greeting of congratulation.'[33]

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[32] For discussion of the phonemic interpretation of these sequences, see footnote 24 in this chapter.

[33] This vowel ranges around a norm which is near the lower boundary of the writer's English vowel in 'but,' so that early recordings repeatedly symbolized that phone and a lower one as allophones of /a/. Hearing and recording were not consistent, however, and it began to appear that the variation was around a single norm and not around two different norms as for positional allophones. The coincidence of the LGV norm with the border between two of the writer's English vowels and two phonetic norms he had drilled prejudiced his hearing. Some utterances of /a/ are definitely higher than others, but they range around the single described norm.

3.1222 Other vowel phenomena. Besides the phonetic facts described for the allophones of the vowel phonemes above, certain other phenomena concern several vowels; these are best described separately.

3.12221 Two part syllabics. The two part syllabics /ei, ai, au, oi, ou/ have been described with regard to their composite allophones under the vowels which compose them. Any of these five sequences of vowels occurring uninterrupted by any terminal constitutes a single two part syllabic. Each has a syllabic vocoid as a first member and a post-syllabic vocoid second member. Because of formational parallelism and distributional similarities, these constitute a single set of syllabics: /hein/ [he$^{i}\tilde{n}$] 'put it down'; /kain/ [ka$^{i}\tilde{n}$] 'brave'; /sauk/ [sa$^{up}\underline{k}$] 'species of pandanus'; /hoina/ [hc$^{i}\tilde{n}$a] 'crayfish'; /ouk/ [...o$^{up}\underline{k}$] 'pain.'[34]

3.12222 Nasalization of vowels. Preceding nasals vowels occur with freely varying nasalized and non-nasalized allophones; there is considerable variation among speakers: /in/ [...i̯n, ...in] 'say it'; /hɪnaken/ [hɪ̯nag̃-n, hɪnag̃-n] 'three'; /an/ [...a̯n, ...an] 'I, me'; /kon/ [kɔ̯n, kɔn] 'edible grub'; /wakkʊn/ [wakʊ̯n, wakʊn] 'funeral pig'; /pum/ [pṵm, pum] 'species of tree.'[35]

3.12223 Voicelessness of vowels. Particularly in the final syllables of the contour preceding sentence terminal and less frequently elsewhere, voiceless allophones of vowels occur as an apparently contrastive stylistic item.[36] These allophones are written with upper case vowel letters in the

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[34]This analysis is adopted in preference to an analysis of these items as vowel plus /j/ or /w/ because: (1) The laminal allophones occurring after /i/ elsewhere occur after /Vi/ also; if the two part syllabic is described as including /i/, the common element in the two environments is the conditioning factor for the allophones in question. (2) More importantly, the analysis adopted avoids positing unique final clusters.

phonetic notation and are indicated in the phonemic orthography by subscript circle as a stylistic symbol: /akeikhe̥'+ wathe̥.+ meake-me̥kke̥.+ / [...age^{i}k̃^{h}ɛ̃' wat^{h}ɛ̃ meag^{3}mɛkɛ] 'he killed another, a Meake man.'

3.12224 Extra length of vowels. Lengthened vowel allophones occur as apparently stylistically contrastive; they are symbolized by colon following the vowel letter in the phonetic notation and by colon following the superscript number indicating intonation contour level in the phonemic transcription: /mu^{3}k^{-4}-at/ [mù^{3}ga^{45}t] 'long ago'; /mu$^{3:}$k^{4}-at/ [mù^{3}:ga^{45}t] 'very long ago.'

3.123 Extra-systematic items. Extra-systematic nasalization of vowels occurs in certain reply forms: /+ 'o, + 'ǫ/ ['c, 'ç] 'yes.'[37] Extra-systematic voicelessness of vowels occurs in certain exclamations: /u̥i̥/ [ɯɪ] 'exclamation of incredulity.'[38] Ingressive lung air occurs as an extra-systematic airstream most commonly used in attention-assuring forms spoken by a listener periodically throughout the speech of a speaker; this airstream is indicated by three acute accent marks following the form: /+ 'ą´´´/ ['ą´´´] 'attention-assuring form'; /+ 'ǫ´´´/ ['ç´´´] 'attention-assuring form'; /+ 'l´´´/ ['ɬ´´´] 'hesitation form, exclamation of delight about food.' Ingressive mouth air occurs in the production of bilabial clicks used as exclamations of pity, although they are much more common in other dialects; these are indicated by a bilabial stop with three grave accent marks: /p```/ [p```] 'exclamation of pity.'[39]

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[35]See section 3.123 for extra-systematic nasalization of vowels.

[36]See section 3.123 for extra-systematic voicelessness of vowels.

[37]This kind of data was called contrastive for /k^{w}/ and /ŋ̥/, but is here considered extra-systematic since nasalization cannot be demonstrated as contrastive in the general vocabulary but only in this special reply form. Compare extra-systematic nasalization in English 'uh-huh.'

3.13 The distribution of allophones of macrophonemes in macrophonemic units

In the following discussion attention is called to contrastive units larger than the segmental phonemes, made up of those phonemes and recognized by modifications of them. The phenomena appear to comprise a layered hierarchy of units with definable, contrastive centers and terminals; for convenience those centers and terminals are here called macrophonemes, and the units which they define are called macrophonemic units. Four units are described as basic in the system: the syllable, the phonological word, the intonation contour group or contour and the phonological sentence.[40]

3.131 The syllable. The syllable consists of one syllabic, either a single vowel or a two part syllabic, with or without one preceding consonant and with or without one following consonant. Where two syllables join within a word nucleus or uncliticized word, any intersyllabic consonant or consonants except /w/ or /j/ are most easily described as interludes not clearly assignable to either syllable; /w/ and /j/, which do not occur medially in morphemes, are assigned to the syllable including the following syllabic. At terminals of larger macrophonemic units consonant clusters are interpreted as belonging one member to one unit and the other to the other, with the terminal between the cluster members. The contrastive center of the syllable thus is the syllabic, indicated by vowel letters, and, uniquely among the four basic macrophonemic units, syllable terminal

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[38]This voicelessness is structurally different from stylistic voicelessness as described in section 3.12223. Here certain forms are always voiceless; there forms with normally voiced vowels occur with voiceless vowels in certain positions.

[39]Compare extra-systematic airstreams in English gasp, and 'tsk.'

[40]Compare Kenneth Pike's hyperphonemes, especially the discussion in section 9.6, op. cit., Part II, pp. 63-66.

is not contrastive:[41] /nakte/ (two syllables, interlude cluster) 'my groin'; /sail-ekken/ (three syllables, first border at nucleus terminal, second border indeterminate at interlude cluster) 'cowry shell'; /wakeikha/ (three syllables, borders indeterminate at interlude consonant and cluster) 'they came'; /lek-han/ (two syllables, border at nucleus terminal) 'lift it';[42] /inajuk/ (three syllables, first border indeterminate at consonant interlude, second border precedes /j/) 'their fear.'

3.132 The phonological word. The phonological word consists of a syllable or group of syllables with only one primary word stress. Since this stress occurs on final syllables of words in most cases and in most other cases is followed by stressless syllables which are distinguishable from pre-stress syllables of other words, symbolization of two terminals eliminates need for symbolization of primary stress. Nucleus terminal is indicated in the phonemic script by a hyphen; it occurs following primary word stress and followed by stressless syllables in the same word, which constitute a clitic. An exception occurs in some words including two nucleus terminals; in this case primary word stress precedes the first of these.[43] Word terminal is indicated by a single space following a symbol or symbols for segmental phonemes; it occurs following any clitic or the primary stressed syllable of any uncliticized word. Phonetically, primary stress consists of upgliding pitch and/or increased loudness. The beginning and end points of this pitch glide are matters of intonation. Except where

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[41] The term interlude is from Charles Hockett, A Manual of Phonology, (Baltimore, 1955), p. 52.

[42] There is a phonetic difference between the /kh/ sequences in /wakeikha/ and /lek-han/; in the first the /h/ is fortis and closely joined to the /k/ like strong aspiration, but in the second the /h/ as part of a stressless clitic syllable, is lenis and more loosely joined to the /k/.

it coincides with an intonational upward glide, involving more than one level, this glide marking stress is a quick, short upglide from a slightly lower pitch to one of the intonationally contrastive levels, usually level three.

In one-syllable words not in the final contour of a sentence nor contour final in the contour in which they occur, a short pitch glide to level three and moderate length and loudness mark the stress: /nit joma-nen/ [nìr jcmàn3n] 'by us locals.'[44] In two syllable words not including clitics and not in the final contour of a sentence nor contour final elsewhere, primary stress is most commonly marked by a short glide to pitch level three, and the preceding syllable is on level four: /jappu jappu jappu-nen/ [japùjapùjapùn3n] 'after we fought and fought and fought.' In isolation, intonation contour and sentence terminal occur with the item, so that the two syllables occur with nearly equal time and nearly equal highest limits of pitches: /pɩte.+ / [pɩr3] 'two.'

In most words of three or more syllables not in the final contour of a sentence or contour final elsewhere, the initial syllable is pronounced with somewhat increased loudness and a secondary upward pitch glide. The middle syllable or syllables are shorter, lower and less stressed than either the first or final syllable: /hɩnaken wattuku.+ / [hɩnag3-nwatugu·] 'we killed three (long ago)'; /wamatʊe-nen akeikhe wathe.+ / [wamaǐʊ3n3n age ik 3wat 3] 'Pig's-bird killed another.'[44]

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[43]The presence of the second is recognized by intonational features to be discussed in sections 3.133 and 3.136 below.

[44]In these illustrations a plus mark after a superscript number indicates raised pitch above the level marked by that number, and a minus sign indicates lowered pitch. Raised dots next to symbols mark slight length.

There are, however, other words of two or more syllables which from presently available data must be described as having a second and contrastive stress occurring only when a one syllable clitic is included in the word. This independent secondary stress consists of added length and loudness and falls only on non-final syllables, so that the three syllables of a trisyllabic nucleus occurring with independent secondary stress on the medial syllable have approximately equal length and loudness, in contrast with those forms on which only primary predictable stress occurs and the medial syllables are shorter and less stressed. Independent secondary stress is indicated in the phonemic script by a superscript tilde. Syllabics which are not short and stressless are marked in the phonetic script with a raised dot next to the vowel letter: /hɪppĩtɪk-ka.+ / [hɪ·pɪ·rì·ka] 'sweet potato leaf'; contrast /supputuk-ka.+ / [su·purù·ka] 'sweet potato leaf (alternate form)'; /luãkek-ken.+ / [lu·a·g̃·k3n] 'luake seeds'; contrast /etake-nen.+ / [...3·rag̃·n3n] 'from the lung'; /hɪttĩki-ma.+ / [hɪ·tɪ·gì·ma] 'Hitigima (place name)'; /ãɪ-pa/ [...a·ì·ba] 'at his, her, its house'; contrast /atɪ-pa/ [arì·ba] 'at that place.'[45]

[45] An alternative analysis would be to consider this secondary stress as a shifted primary stress in these forms. Since the pre-terminal syllable still carries short pitch upglide, it is however convenient to consider the primary stress as still occurring on that syllable, although it is not markedly longer or louder than the preceding syllable. The main contrast in forms including and not including secondary independent stress is in rhythm pattern and relative stress of the syllables. This has been marked in this section of the discussion only to avoid cluttering illustrations with unexplained detail in earlier sections.

Earlier during the analysis this secondary stress was considered a predictable phenomenon on the basis of the phonemic shape of words, and some data indicate that this is very nearly true. For example, this stress only occurs on central and front vowels and only on syllabics followed by voiced segments. Further checking of the data indicates, however, that no statement of predictability thus far proposed is valid.

Clitics do not occur with primary or secondary stress; they have no extra loudness, and where they do not occur with intonational glide they carry level pitch. They are also pronounced more rapidly than nuclei or words without clitics except contour finally. Contour finally certain intonational phenomena indicate the presence of two nucleus terminals in a single word; in that case, the word nucleus with primary stress on the ultima precedes the first nucleus terminal, and the remainder of the word is a clitic. The portion of the word preceding the second nucleus terminal includes the word nucleus and is the larger nucleus; the remainder of the word is the final clitic:[46] /laɪk waɪk welakeikhasik-en/ [laìgwaìgw3lag.... ...e^{i}k^{h}asìg3n] 'after they had been going and coming'; /lɪpaken-mekke-nen/ [lɪbag3-nm3k3n3n] 'by the people across the river'; /aik ɪlɪ-pakke/ [...à^{i}g̃ɪlìbak3] 'on that side of the stream'; /pʊ-jɪkk3 ta' ninom hanó-akaku.+ / [pʊ̀jɪk3tà'ninc̀mManc̀agagu] 'we first came on good terms up this way.'

3.133 <u>The intonation contour group</u>. The intonation contour group consists of one or more words, or in the case of the final contour of a sentence of a final clitic, a clitic or one or more words.

Intonation contour groups begin with onset of full voicing and loudness of syllabics, except for some final contour groups in sentences; even there

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[46] The determination of clitics is not yet completely clear in every bit of recorded text, but it is clear in most cases and probably could be cleared in the remainder by rechecking the questionable material. This has not been possible during the actual preparation of this thesis. Writing of borders on the basis of stress and the other phonetic data described above conforms very closely to grammatical fact. In a small residue where clitics are phonologically demonstrable but morpheme boundary is not yet recognized, it is probable that further analysis will disclose such a boundary. Note that presence of a grammatical boundary does not indicate presence of a clitic, however; many morphemes are suffixed to form part of single phonological words.

the contour group begins with syllabics more voiced and stressed than those at the end of the same group. Following silence or another contour with plus terminal, onset includes occurrences of glottal stop before contour initial vowels. Onset need not be written, since all terminals by which the occurrence of onset can be determined are written. Glottal stop, demonstrably contrastive elsewhere, is written. / 'an.+ / ['an] (34, 35) 'I, me'; /lakɩtɩk wakɩ.+ / [lagɩrìgwagì] (30, 4, 4+ 4 3 4 5) 'I went and came.'

Intonation contour groups occur with contour stress, except for some sentence final groups described below. This stress consists of lengthening of the syllabic with which it occurs and limitation of the domain of contrastive intonation contour or level. The contrastive level or contour occurs on the syllable with contour stress if that syllable is contour final. Otherwise it occurs over a domain beginning at that syllable and reaching the contrastive level on the final syllable. In most cases these phenomena are predictable on the basis of word and nucleus terminals, but because of some cases where this is not true, contour stress is considered contrastive and symbolized in the phonemic script by acute accent mark over the syllabic or syllabics involved:[47] /meaké-a'noko atén elomá'+ / [meag3a'ncgcar3nelcmà'] (30, 30, 3, 4+4 3-3- 34 3 4+ 4 3) 'the appearance of those Meage there.'

Intonation contour groups end with one of two sorts of terminal. Plus contour terminal, written with a plus sign, is often recognized by the occurrence of allophones of the preceding and following phonemes which do not occur elsewhere; this break in allophonic conditioning is most marked when the initial segments of the following contour constitute an environment before which the final allophones of the preceding contour do not

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[47] Contour stress has not been marked in preceding illustrations.

occur, as when voiceless stop allophones occur word finally before vowels or consonantal vocoids: /'ap + wukhá-hupɩ'+ / ['àpwukʰàhuɓɩ'] 'Wuka-hubi men.' Plus terminal also has a freely varying feature of pause. Pause may or may not occur with any plus contour terminal except immediately preceding the contour, in the same sentence, which ends with sentence terminal; pause does not occur in that environment except in interrupted or hesitating forms.[48] Glottal also occurs associated with plus contour terminal; that phoneme is alternately present in association with plus contour terminal following a vowel or liquid contour final segment. Because glottal stop is contrastive elsewhere, it is symbolized independently of the terminal: /mottók + 'o halɩ hɩlík/ [mctc̀-'c̀halìhɩlìk] 'completely burning down the villages'; /nukkunémen'+ nalók-en'+ / [nukun3m3n' nalcg3n'] 'after they had eaten, having eaten.'

Zero contour terminal is characterized by occurrence of contrastive intonation contours or levels without any break in allophonic conditioning and without any pause or glottal stop; this terminal is written here by a zero following the superscript intonation-marking numbers:[49] /lakɩtík wakí.+ / [lagɩrìgwagì] 'I went and came back'; /hupɩk-kiá' meaké+ / [huɓìkià'meag3-] 'the Hubi-kiak and Meage (excitedly).'

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[48]Thus plus terminal is considered to occur wherever pause occurs, but not all plus terminals occur with pause. This analysis does not distinguish different types of pause (except for the mention of hesitating or interrupted forms), as Pike did for English and still does in modified fashion: Kenneth Pike, op. cit., Part II, section 9.4. The difference he attributes to two sorts of pause is here attributed to the presence or absence of sentence terminal. Pause is considered a secondary feature of the contour group with which it occurs, as Pike now treats it, and not as a segmental phoneme, as Bernard Bloch treats pause in Japanese: "Studies in Colloquial Japanese IV," Language 26:115 (Baltimore, 1950).

[49]The term zero is chosen for parallelism with the term plus and because of the absence of most special terminal features with this terminal.

Intonation contour groups occur with contrastive intonation contours of four pitch levels numbered from one, highest, to four, lowest, which are written here with superscript numerals. Levels of pitch which are phonetic variants of the contrastive levels are indicated by numerals and plus and minus signs in square brackets; phonetic data for the segments are omitted except where pertinent to the discussion.

Level one is the highest pitch level of the speaker and is often of falsetto quality. Higher allophones within this highest range occur particularly on clitic syllables at the ends of contour groups in the middle of sentences: [4]2 [1-]1[+]0 30 4[5] /heleṇ-hokó mûk-isoko.+ / 'We chased them all out'; 1-4[5] /molamelaik.+ / 'Bromley!'

Level two is the next contrastive range lower than one. Contour finally in the middle of sentences this level is markedly higher than level three, but sentence finally, where sentence terminal occurs, the interval between level two and a preceding level three is considerably reduced: [4 3] 2 /kamo ikha lakunem-én +/ 'when plural subject refrained...'; 302[-]: /án-a.+ / 'Is it I?'

Level three is next lower and is the commonest pitch of contour medial syllables occurring with primary word stress: [3 4 3 4] 3 / 'o halι hιlιk+ / 'setting fire to villages.'

Level four is lowest and has two distinct allophones. The lower of these, a downglide to phonetic level five, occurs on any sentence final syllable on level four if no added length is present. If that syllable occurs with added length, the downglide is a less marked downward fade from level four. On clitic syllables the glide is more rapid and goes lower: [4] 4 [3 4 3 4] 3 /mottók+ 'o halι hιlík+ / 'burning villages down completely';

[4]30 4:[4-] [4]30 4[-5]
/najúk-e.+ / 'my fear, I'm afraid (pensive)'; /najúk-o.+ / 'my fear,
[4+ 4]4[-5]
I'm afraid (affirmative)'; /nakeikák.+ / 'my friend (spoken as an appendage
to a longer utterance).'[50]

Illustrations are given to contrast pairs of pitches: (1) Pitches
[3-]2
one and two are in contrast: /'attɩ molameláik.+ / 'Is that Bromley?
[3-]1
(normal question)'; /'attɩ molameláik.+ / 'Is that Bromley? (effusive
[4] 30[3 3]
question).' (2) Pitches one and three are in contrast: /helén-hoko
30 4[5] [4]2[1-] 10[+]
mík-isoko.+ / 'We chased them out completely (statement)'; /helen-hokó
30 0 2[5]
mík-isoko.+ / 'We chased them out completely (enthusiastic report)';
[4]1:0 4[5] [4] 30 4[5]
/ 'ekkík ɩkí.+ / 'I said, "Whew!"' / 'ekká ɩkí.+ / 'I said, "(It's) a
[4] 20 [4]2
leaf."' (3) Pitches two and three are in contrast: /hupɩk-kiá' meaké+ /
[4]3 [3 3] [4] 3 [3 3]
'the Hubi-kiak and Meage (excitedly'; /lɩó-lakenek + 'apané-mel-nek+ /
'Lio and his associates, just them, and Abane also, just them (normal
[4 3 4 3 4+4 3] 2
listing of items)'; /kamo ikha lakunem-én+ / 'after plural subject were
refraining (as a distinct unit loosely tied to the remainder of the sentence)';
[4+ 4 4 4] 3 [3]
/welakeikhasík-en+ / 'after they had been (that way) (as a unit closely
tied to the remainder of the sentence).' (4) Pitches two and four are
30 2: 30 4:[4-]
in contrast: /lék-a.+ / 'Isn't it?' /lék-a.+/ 'It isn't. (teasing)'
[4+4]2[4] 30 20 4[5]
(5) Pitches three and four are in contrast: /meaké+ mottók kí-akeikhe.+ /
[4] 4 [3 4 3 4]3
'The Meage all came in'; /mottók+ 'o halɩ hɩlík+ / 'completely burning
down villages.'[51]

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[50]Note that although four contrastive levels are postulated and some contours are similar to English contours, the system is quite different. First, stress is usually marked not by high but by a short upward gliding pitch, and lengthened syllables, when mechanically slowed to half speed, are heard as a series of quavers or short glides. Second, in most cases the 'intonation contour' is actually only a single contrastive pitch occurring contour group finally, and preceding pitches are predictable.

[51]All illustrations in this paragraph are from text material.

Note these further illustrations of contrastive pitches and contours on identical segmental phonemes: /nakeikák.+ / '(That's) my friend'; /nakeikák.+ / '...my friend (appended to a longer utterance'; /nén+ / 'Well...(hesitation form preceding another contour)'; /nén.+ / 'That's right'; /nén.+ / 'Yes, that's right'; /nén.+ / 'That's right!' /'olokkomá.+ / 'Olokoma! (calling from a distance)'; /'olokkomá.+ / 'It's Olokoma'; /molameláik.+ / 'Is that Bromley?' /molameláik.+ / 'Is that Bromley ? (effusive)'; /molameláik.+ / 'Bromley (derisive)'; /molameláik.+ / 'Bromley! (calling from close by).'[52]

3.134 The phonological sentence. The phonological sentence consists of one or more contour groups and is the largest unit posited in this description. It occurs with sentence stress and sentence terminal.

Sentence stress occurs with phonological sentences and consists of non-contrastively raised pitch and limitation of the domain for the sentence terminal contour. This stress is written in the phonemic script by use of the circumflex accent over the syllabic involved. When this stress occurs on the final syllable of a sentence, the tapered stress and falling pitch characteristic of sentence terminal are heard only at the end of that syllable. Elsewhere, the sentence terminal contour group begins with the syllable following sentence stress: /hal la-ǒk.+ / 'Greetings! (an emphatic pronunciation)'; /wolǒk wakı.+ / 'I have brought it.' Note that normally sentence stress coincides with a contour stress, which is then not written separately.[53]

Phonological sentences end with sentence terminal, written with the period. This terminal is marked by distinctive features occurring over

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[52] For discussion of predictable pitches see section 3.136 below.

the span from sentence stress to the end of the sentence; that span is called terminal span. With downgliding intonation contours, there is gradual diminishing of loudness and pitch throughout this span. Any stylistic voicelessness usually occurs in this span. With level or upgliding intonation contours, the pitch-lowering effect of sentence terminal is actualized in narrowed interval of upglide and final downward fading of level pitches. In all cases there is final relaxation of the articulatory muscles. Plus contour terminal of the final intonation contour group occurs associated with sentence terminal:[54] /'ăn.+ / 'It's me, mine'; /sekkelokŏ nasukú.+ / 'We cut them up and ate them'; /'án-ă.+ / 'Is it mine?' /'ăn.+ / 'Is it mine? (alternate form)'

3.135 Stylistically contrastive features. Two stylistic features, voicelessness of vowels and extra length of vowels, are described as contrastive. The phonetic changes involved were described in section 3.1222 above. These features are not part of the lexical items, nor are they centers or terminals of one of the four basic macrophonemic units but may be considered special macrophonemic units. Voicelessness of vowels, written with subscript circle, most commonly occurs in sentence terminal span and apparently heightens dramatic effect of narration. Extra length of vowels is indicated by a colon following the intonation contour numbers; it frequently occurs with intonation carrying clitics /-a/ 'question' and /-o/ 'affirmation' and /-e/ 'greeting intimacy,' but it also occurs elsewhere: /'akeikhĕ wathé.+ / 'He killed another'; /lék-ă.+ / 'No...'

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[53] Sentence stress has not been written in earlier illustrations.

[54] Thus pause is made a feature of only one contrastive unit, plus contour terminal. Also the sentence appears clearly as made up entirely of contour groups each with its own terminal. Sentence terminal is thus made to account only for distinctive features not occurring elsewhere.

3:0 4[5]
/mŭk-at.+ / 'a very long time ago.' A satisfactory analysis of other stylistic features, like speed of utterance, has not yet been made. [55]

3.136 <u>The word in contour and sentence</u>. In the preceding discussion of the contrastive units and terminals and centers it was not possible to give the basis for prediction of non-contrastive pitches and related phenomena in most cases, for this involves all four basic macrophonemic units and the special stylistically contrastive features. It is now possible to complete the description of the macrophonemic data by observing words as they occur contour and sentence finally.

In sentence medial 4-3 contours, final words occur as they occur contour medially, as described in section 3.132, except for added length of the syllabic occurring with contour stress: 3 [4] 3 [3] / 'áp + wukhá-hupɩ' + [4+4]3[3]0 3 meaké-nen tá'.../ ['àp^{h} wuk^{h}àhubɩ'meˈag3̀ˈnɔ̃ntaʼ...] 'The Meage first (chased out) the Wuka-hubi...'

In sentence terminal contours the added features of terminal span occur. Usually this span includes only the last final clitic, clitic or uncliticized word. When a clitic occurs, any downglide is unbroken and rapid, with rapidly falling stress. In the case of a final uncliticized word, the word stress is heard as a 'blip' or slight upturn superimposed on the falling pitch glide and the decline of stress. Slight length is also heard with this word stress as elsewhere; where the syllabic is voiceless, fortis articulation and this slight length are its only identifying features. No contour stress is considered to be present in sentence terminal contours with downward gliding pitch to level four when those contours occur with clitics: 3̌0[4+ 4-]4[-5] /'ǎn wesikín.+ / 'I am going to return';

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[55]The parentheses around the intonation marking numbers indicate these pitches occur on these syllabics when they are voiced.

30 [4]30 4[-5] 30 30 4[-5]
/'án nõkŏ-kin.+ / 'I am going to go to sleep'; /'án hĕp-ekein.+ /
'I am going to neglect it.' When the intonation carrying clitic /-o/ is added to these items, a new situation is introduced; the final word now may have two nucleus terminals. This possibility only occurs contour finally, and where it does occur, the first of the nucleus terminals marks preceding word stress and the second marks the fact that the remainder of the word is still cliticized as a part of it and may be the domain of
30 [4+4]3[+]0 4[5]
terminal span: /'án wesikĭn-o.+ / 'Yes, I am going to return';
30 [44-3] 30 4[5] 30 [3] 30 4[5]
/'án nõko-kĭn-o.+ / 'Yes, I am going to go to sleep'; /'án hep-ekĕin-o.+ /
'Yes, I am going to neglect it.'

In sentence terminal contours gliding upward to level two, a glide from slightly below level three to level two occurs on the final syllable of uncliticized words. On words with clitics the final clitic carries a quavering pitch two, if extra length occurs; the preceding segment of a clitic, if any, carries a step or glide from level three to level two:
30 [4+4][3-]2 30 [4 3 3-]2
/'án wesikĭn.+ / 'Am I coming back?' /'án noko-kĭn.+ / 'Am I going to go
30 30 [3] 2
to sleep?' /'án hĕp-ekein.+ / 'Am I going to neglect it?' Note what happens when the intonation carrying clitic /-a/ 'deliberative, interrogative' is added:
30 [4+4]3[+]2:[-]
/'án wesikĭn-a.+ / 'Am I going to come back?'
30 [4 3 3-]202:[-] 30 [3][3]20 2:[-]
/'án noko-kĭn-a.+ / 'Am I going to go to sleep?' /'án hep-ekĕin-a.+ /
'Am I going to neglect it?' In all these cases, the interval between levels three and two is shortened under the influence or in the environment of terminal span. In the last example the final syllable sometimes occurs with lower pitch than the preceding syllable, and often the step upward in pitch on that syllable is barely discernible.

Sentence medial contours with upglide to level two are similar in pattern to the sentence final contours with upglide to level two, except that the phonetic interval of glide or step between levels three and two is greater sentence medially. A syllable on level three before level two may be higher than other syllables on level three, and pitch tends to glide on upward to the last syllable of the contour: [3 4+4]3[+]2 /tɪ meake-té+ / 'that, about the Meage...' [4+4 3 3+] 2 /akeikhe-nen-hé+ / 'by another.'

Pitch level four contours often occur at the beginning of sentences, sentence finally or with short sentences following other sentences to indicate that the second sentence is appended in meaning to the first. In such contours no pitch, not even with word stress, goes higher than level four:

[4] 4 [3 4 3 4]3
/mottók + 'o halɪ hɪlók + / 'completely burning down villages';

30 [4]3 4 [5] [4](3:)0[4]4[5][4] 4 [(4-5)]
/'án ekká + 'ɪkɪ.+ / 'I said, "Leaf."' /akeikhę̨ wathę̨.+ meaké-mękę̨.+ /

'He killed another, a Meage man.'

3.2 THE DISTRIBUTION OF THE PHONEMES

3.21 Distribution of the segmental phonemes

The macrophonemic units described above, the syllable, word nucleus and phonological word, contour group and phonological sentence, are not equally relevant nor the only relevant units for discussion of the distribution of segmental phonemes. An additional phonological unit consisting of a contour group or sequence of contour groups beginning with silence or plus contour terminal and ending with the next following plus contour terminal is posited and called the plus terminal span. Two grammatical units are also relevant, the morpheme and the inflected word, which is defined as any word containing only root morphemes with or without inflectional affixes

but including no connective affixes. For convenience, three kinds of words referred to in the following discussion are given abbreviated labels: (1) N-words consist of word nuclei preceding any clitics and of uncliticized phonological words; (2) C-words are phonological words, including clitics; (3) I-words are the inflected words defined above; they are grammatical units including all N-words minus any connective affixes occurring in them.

3.211 The distribution of segmental phonemes in the syllable. One syllabic, which may be any single vowel or two part syllabic, occurs as the syllable center, and any occurrence of a single vowel or two part syllabic constitutes a syllable center. Syllable margins are most conveniently described in terms of morphemes.

3.212 The distribution of segmental phonemes in the morpheme. There are restrictions on the distribution of segmental phonemes in morphemes both with regard to positions in the morpheme and with regard to sequences of phonemes in the morpheme. The discussion is limited to morphemes occurring in the middle of plus terminal spans, for other restrictions apply at the borders of those units. LGV Dani morphemes have been observed to consist of from one to four syllables: /o/ 'wood'; /pete/ 'two'; /hɨnaken/ 'three'; /ipipilo/ 'species of bird.'[56]

3.2121 Positional restrictions on distribution. Morpheme initially any single consonant except glottal stop or /ŋ/, the velar nasal, may occur:[57] /pelal/ 'snake'; /tale/ 'sand'; /ket/ 'new'; /k^{w}e, ke/ 'trail';

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[56]This example, including reduplication, and all others of four syllable morphemes are doubtful, but until morpheme boundary is clearly indicated, it is perhaps easier to describe morphemes of four syllables.

[57]Initial glottal stop is part of contour onset; see section 3.133.

/sʊk/ 'mushroom'; /hʊk/ 'wrong'; /mene/ 'dog'; /nena/ 'what'; /leket/ 'fence'; /wa/ 'greeting'; /jake/ 'stone adze.' Any single vowel or two part syllabic, except possibly /oi/, may occur morpheme initially: /i/ 'water'; /ɩ/ 'yes'; /el/ 'sugar cane'; /a/ 'sexual intercourse'; /o/ 'wood, village'; /ʊt/ 'neck'; /ʊok/ 'let's say it';[58] /eil/ 'eye'; /aik/ 'tooth'; /aukhene/ 'long ago';[58] /ouk/ 'pain.'[59]

Morpheme finally any single stop or liquid may occur, although the labio-velar /k^{w}/ only rarely occurs in this position: /ap/ 'man'; /at/ 'he, she'; /eak/ 'his or her child'; /lɩak^{w}-sɩlɩkhe/ 'when the subject had put it up';[60] /kem/ 'grass used for skirts'; /nen/ 'yes'; /saŋ, san/ 'a type of bark container'; /al/ 'feces.' Any single vowel may occur morpheme finally: /sili/ 'girl's skirt'; /ɩlɩ/ 'that'; /pele/ 'Bele river'; /ela/ 'sharpness of a blade for cutting'; /kolo/ 'crooked'; /pʊ/ 'up'; /lukʊ/ 'a species of hardwood.'

Morpheme medially any single consonant except /k^{w}/, /ŋ/, /h/, /w/ or /j/ and any single vowel or two part syllabic may occur: /apan/ 'unfinished'; /hoto/ 'short'; /eke/ 'her co-wife'; /omo/ 'his, her, its sore'; /monouk/ 'the common cold'; /holo/ 'long ago'; /lese/ 'long house including round dwelling'; /a'ɩt/ 'his, her, its dislike';[61] /sin/ 'a species of tree'; /nɩŋ, nɩn/ 'tight'; /nen/ 'yes'; /an/ 'I, me'; /man/ 'sharpening stone'; /kon/ 'edible grub'; /hʊn/ 'married man'; /pum/ 'a species of tree'; /heik/ 'oak'; /saik/ 'a species of pandanus'; /sauk/ 'a species of pandanus'; /hoina/ 'crayfish'; /souk/ 'door for closing doorway.'

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[58]These forms are not single morphemes, but what is word initial must also be morpheme initial.

[59]The two part syllabic /oi/ has not yet been recorded initially.

[60]This is one of very few examples with /k^{w}/ here; there are none with word final /k^{w}/.

The following types of clusters of two consonants occur morpheme medially: (1) All stops except /k^{w}/ occur in geminate cluster, and the cluster /kt/ probably also occurs: /appe/ 'his mouth'; /loppok/ 'to each his own'; /pɪkkɪ/ 'completely dead'; /akte/ 'his groin.'[62] (2) The cluster /ks/ is the only recorded example of stop followed by voiceless continuant in this environment: /hakse/ 'cooking pit.' (3) Two clusters consisting of stop followed by liquid, /pn/ and /pl/, have been recorded: /saple/ 'a variety of bananas'; /metapne/ 'a species of tree.' (4) Of clusters consisting of liquid followed by liquid, only /lm/ has been recorded, and that only in some idiolects: /alme, ame/ 'back tooth.' (5) Of clusters of glottal stop followed by liquid, /'m/, /'n/, and /'l/ occur: /a'mouk/ 'his liking for it'; /a'ne/ 'his muscular vigor'; /sa'ne/ 'garden fire, grass fire'; /so'le/ 'smoke.'[63]

Morpheme medial clusters of syllabics include no sequence of a high close and a high open vowel, in either order, and no sequence of more than two syllabics. Following the interpretations explained in footnote 24, above, no syllabic cluster with initial /i/ occurs morpheme medially, except possibly the doubtful cluster /ii/ in /kiik/ 'saw (tool).'[64] Clusters with initial /ɪ/ include possibly /ɪɪ/ in /ɪlɪɪk/ 'sloping up,' but this may be morphemically complex; /ɪa/ in /lɪa/ 'light'; /ɪo/ in /lɪo/ 'Lio (man's name)'; /pɪon/ 'species of reed.' Clusters with initial /e/ include

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[61]There may be morpheme boundary in this form.

[62]There may be morpheme boundary here, although the cluster is probably morpheme medial in any case.

[63]The forms with initial /a/ may include morpheme boundary, but the parallel forms with no recognizable boundary between /'n/ and /'l/ indicate that this is a valid cluster type, at least.

[64]This form is probably morphemically complex, consisting of a very uncommon verb form now used as a name for western saws.

/ee/ in /teek/ 'fording'; /ea/ in /weak/ 'bad.' Clusters with initial /o/ include: /aɩ/ in /kaɩn/ 'pandanus'; /ae/ in /laet/ 'spicy leaved shrub'; /ao/ in /kao/ 'watchtower.' Clusters with initial /o/ include: /oe/ in /oe/ 'his older sibling'; /oa/ in / oak/ 'his bone'; /oo/ in /took-hoko/ 'man's name (meaning unknown).' Clusters with initial /ʊ/ include: /ʊe/ in /sʊe/ 'bird'; /ʊa/ in /sʊap/ 'bird arrow'; /pʊa/ 'light yellow earth.' No clusters are interpreted to occur with initial /u/ or an initial two part syllabic.[65]

3.2122 Sequential restrictions on distribution. There are several pertinent restrictions on the distribution of phonemes in morphemes in terms of sequences of phonemes. Morpheme initially any consonant which occurs in that position may occur before any vowel except that /k^{w}/ occurs only before /ɩ/ and /e/. Morpheme finally, any consonant occurring finally may occur following any single vowel, except that /ŋ/ has not been recorded after /i/ or /u/ in local words. Following two part syllabics ending in /i/, only nasals /m/ and /n/ and lateral /l/ and stop /k/ occur; following /ai/, /m/ is recorded in only one, doubtful item, and following /oi/ only /l/ has been recorded finally in single morphemes, although /n/ and /k/ have been recorded word finally after /oi/ in morphemically complex items. Following two part syllabics ending in /u/, only /m/ and /k/ occur.

Morpheme medially there are limited possibilities of succession of syllabics separated by consonants. No morpheme has been recorded with two

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[65]Apparent clusters with initial /i/ are interpreted as including /j/, and those with initial /u/ or /ou/ as including /w/; see footnote 24, page 40, above. Note the following: /sijep/ 'clan name'; /sijat/ 'area south of the range'; /asijok/ 'breeding boar'; /uwe/ 'Uwe river'; /uwan/ 'long'; /huwon/ 'a type of bark container'; /ouwak/ 'physiological term of uncertain meaning'; /houwok/ 'small adze.'

two part syllabics in successive syllables, nor with a high close or high open vowel following or preceding a two part syllabic in successive syllables, nor with high close vowels following or preceding high open vowels in successive syllables. The restrictions on certain consonants following certain syllabics are valid morpheme medially as well as morpheme finally, except that medially /kk/ occurs after two part syllabics, and /tt/ occurs after two part syllabics ending in /i/: /houkko/ 'very much'; /eittep/ 'his, her knee'; /taitta/ 'mama (baby talk).' Where /k/ occurs morpheme medially between two syllabics one of which is a mid or low vowel /e/, /o/ or /a/, the other syllabic is also a mid or lower vowel or a two part syllabic.

3.213 The distribution of phonemes in the inflected word. The distributional restrictions described for morphemes are valid for I-words except for the following: (1) The labio-velar /k^w/ never occurs I-word finally. (2) I-word medially the phonemes /k^w/, /h/, /ŋ/, /w/ and /j/ occur between vowels: /ak^we/ 'his wife'; /ekehe/ 'his soul'; /hɬɬɲɬtoko/ 'boy's name'; /nawen, naen/ 'my garden bed';[66] /najuk/ 'my fear.' (3) Geminate stop cluster /k^wk^w/ occurs I-word medially: /ak^wk^we/ 'its opening.' (4) Clusters of stop followed by /h/ occur I-word medially, although only one form occurs, for most speakers, with this cluster and not with a corresponding geminate stop cluster in an alternate pronunciation: /nikho/ 'subject walks repeatedly'; /nikko/ 'subject eats repeatedly';[67] /watti, wathi/ 'I killed him.' (5) Additional stop-nasal clusters occur

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[66] Some speakers do not have /w/ I-word medially.

[67] Some speakers have this pair as homophones, with alternate pronunciations as for /watti, wathi/ 'I killed him.' LGV exhibits a tendency to replace stop-/h/ clusters with geminate stop clusters.

I-word medially: /tn/ freely varying with /'n/ in /wetnek, we'nek/ 'let him, her come now'; /watni, wa'ni/ 'kill him (plural subject).' A new cluster type with these items in reverse order also occurs: /nt/ in /kaintek/ 'the important ones.' (6) Additional syllabic clusters occur medially in I-words: /aa/ or /au/ in alternate forms of /laak-kolek, lauk-kelek/ 'while the singular subject is going'; /aei/ in /naeim/ 'my knife, my battle'; /oɪ/ in /noɪmɪ/ 'my older siblings'; /uo/ in /luok/ 'let's go.' (7) The restrictions on sequences of syllabics separated by consonants are modified. Two successive syllables with high open vowels may precede or follow a syllable with a high close vowel if a morpheme boundary occurs between the syllables with diverse levels of vowels: /kumusin/ (root /kumut-/) 'search for it'; /wat-hisɪɪ' lek/ (clitic includes prefix /hi-/) 'the subject didn't kill it for you (plural).'

3.214 The distribution of phonemes in the nucleus or uncliticized word. Some common connective suffixes occur as parts of N-words, so that when a consonant initial suffix follows a consonant final form, clusters occur, some of which do not occur in morphemes or I-words. These clusters are, however, of the same general types as those previously described: /pm/ in /neittepma/ 'on my knee'; /tm/, freely varying with /'m/, in /leketma, leke'ma/ 'on the fence'; /km/ after high close vowels as in /pippukmo/ 'on the pippuk grass'; /mm/ freely varying with /m/ in /mummo, mumo/ 'in the dark'; /n̥m/ in /nɪn̥ma/ 'when it is tight.'

3.215 The distribution of phonemes in the phonological word. In words including clitics, consonant clusters at nucleus terminal include all possible combinations of morpheme final consonants with morpheme initial consonants except that */C-j/ and */C-w/ do not occur, /l-n/ does

not occur in all idiolects, and /m-n, ŋ-n/ have not been recorded. The cluster /k^{w}-s/ has been recorded only in this environment: /lɪak^{w}-sɪlɪkhe/ 'when the subject had put it up.'

3.216 The distribution of phonemes in the contour group. Contour group medially, all possible combinations of morpheme final phonemes with morpheme initial phonemes occur at word terminal except for ~~/~~p w/, which does not occur, and for sequences of high close vowels with high open vowels, which do not occur in most idiolects.

3.217 The distribution of phonemes in the plus terminal span. At zero contour terminal all possible combinations of morpheme final phonemes with morpheme initial phonemes occur except for sequences of high close with high open vowels. Plus terminal span initially glottal stop occurs before all vowels: / 'atɪ + 'i.+ / [4]3 3-4[5] 'That's water.' Plus terminal span finally glottal stop may occur after vowels and nasals: /hɪmɪ'+ hɪnaken wattukusik-en / 2 20 'after we had killed three women, long ago'; /nukkunem-en+/ 'when the plural subject had eaten it.'

3.22 The distribution of macrophonemes. Most of the pertinent facts concerning distribution of the macrophonemic units were included in the description of those units. In summary, the syllable includes one syllabic. The word consists of at least one syllable, includes one predictable primary stress and ends with word terminal; the word may also occur with secondary independent stress and with one or two nucleus terminals. The contour group includes at least one final clitic, clitic or word, ends with zero or plus contour terminal, carries one contrastive intonation contour and normally occurs with one contour stress. The phonological sentence includes at least one contour group, carries one

sentence stress and occurs with sentence terminal. Except for the restrictions on sequences of syllabics noted in the various divisions of section 3.21 above, no purely phonological limitations on the occurrence of these units in various positions in larger units or in sequence with each other have been observed.

3.0 SUMMARY OF THE DESCRIPTION

The Dani dialect of the lower Grand Valley has a phonemic pattern unique for Dani, with one set of stops /p, t, k, k^w/ and two voiceless continuants /s, h/ including the major correspondences of the three sets of proto-Dani stops. These stops are distributed morpheme initially, medially and finally, but the voiceless continuants, which correspond in most cases to widely distributed proto-Dani aspirate stops, are markedly restricted in distribution. In pattern of contrasts and in pattern of distribution, the LGV phonemic system is markedly askew with proto-Dani and other extant dialects.

CHAPTER IV

PRACTICAL ORTHOGRAPHIES FOR DANI DIALECTS

The construction of a practical orthographic system or alphabet involves significant factors outside the phonemic structure to be represented; particularly is this true in the case of lower Grand Valley Dani, with its skewed pattern of sound contrasts. For the convenience both of future local readers and of outside investigators, an alphabet that is useful over a wide area is preferable to one of restricted applicability. To devise such an alphabet in this case, the phonemic systems of other dialects must be considered. Such external factors as orthographic tradition in trade and school languages in the area of New Guinea and the availability of symbols on typewriters and in type fonts are also relevant; these will be discussed first.

4.1 THE FACTOR OF OTHER ORTHOGRAPHIC TRADITIONS

The official language for government and higher education in western New Guinea is Dutch, and administrative authorities desire to conduct all new schools either in local vernaculars at the village level, or in the official language. However, Malay or Indonesian is firmly established as the coastal lingua franca and is used in many older schools. If the Indonesian efforts to gain control of western New Guinea succeed, that language will undoubtedly be the official tongue.[1] English is the language of higher education in neighboring Australian New Guinea, the first foreign

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[1] The reader will recall that when Indonesia was given independence in 1949, the status of western New Guinea was left undecided. Indonesian spokesmen actively claim the area, which they call Irian, but the Netherlands government has successfully maintained its right to administer there.

language learned in Indonesian higher schools and the first language learned after Dutch in the schools of western New Guinea.

These three languages all use the digraph 'ng' for the velar nasal, so that that spelling is preferable to an unfamiliar symbol like 'ŋ' where no contrasting sequence of /n/ plus /g/ occurs; there is no such sequence in any dialect of Dani studied thus far, and the digraph may be adopted. Dutch and Malay both use 'j' for a high close front unrounded consonantal vocoid; for that reason that symbol has been used instead of 'y' throughout this study. Likewise, glottal stop has been symbolized by apostrophe since it is a convenient, available symbol and is used with this value in Malay. Dutch and English both utilize 'y' as a vowel symbol, so that it merits consideration for indicating one of the high front vowels. All three of the languages under discussion employ upper case letters for the initial letters of proper names and of sentences; although there is no phonemic advantage gained by following this pattern, factors of prestige and utility in preparing local readers for a second language make that course advisable. These trade languages mark intonational and junctural features by means of traditional punctuation, with minimal conformity to phonemic fact. A more satisfactory system utilizing these graphic devices is recommended for symbolizing Dani macrophonemic units and terminals.

The crucial question with regard to these other orthographic traditions is not, however, merely one of selection of symbols for recognized phonemic units; the problem is whether sounds which are separate phonemes separately symbolized in a second language should be separately symbolized in a vernacular, like Dani, in the area where that second language is or will be extensively used. Kenneth Pike, who has had wide experience in this

field, suggests that in such a situation an orthography may depart from the phonemic facts:

> The only case in which a conditioned variety of sound should receive a separate symbol is one in which certain variants of a vernacular phoneme constitute separate phonemes in the trade language. In such a case the pressures from the social situation may be very strong, and may at times force the investigator to depart from phonemic practices in order to get popular support for his orthography, or may modify his phonemic analysis in such a way through the inclusion of loan words in the vernacular. 2

Both Dutch and Malay have a flap allophone of /r/ in contrast with allophones of /t/. English and Dutch have /v/ in contrast with /p/. All three have /g/ in contrast with /k/, and most allophones of Dutch /g/ are fricative. Thus, if Pike's suggestion were adopted, the intervocalic voiced allophones of the stop series would be separately symbolized as 'v,' 'r,' and 'g'; the voiceless unaspirated stop allophones would be written 'p,' 't,' and 'k.' Dialects with voiced stop series might indicate those phonemes by 'b,' 'd,' and perhaps 'gg' in such a system, and those dialects with three series of stops would have to employ digraphs for one series, perhaps most conveniently 'mb,' 'nd,' and 'ng' for the voiced stops, using 'b' and 'd' for the implosives.

Such an orthography would probably be worth the difficulty entailed in separate symbolization of allophones but for the contrasting, skewed phonemic patterns of the various dialects, and the varying phonetic values of the phonemes. Even for dialects of largely congruent phonemic structures like BV and wV, which are easily mutually intelligible, different alphabets would be required to give alphabetic symbols a value similar to their value in a second language. Thus in BV initial /p/ might be written

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[2]Kenneth Pike, Phonemics: A Technique for Reducing Languages to Writing (Ann Arbor, 1948), p. 209.

'f,' initial /b/ be written 'p,' initial /β/ be written 'b'; but in WV initial /p/ would be written 'p,' initial /b/ be written 'b,' or even 'mb,' and initial /β/ be written 'b' or with a digraph like ' 'b.' These phonetic variations make it impossible to use a single alphabet with letters having in all dialects a value as close as possible to their value in another language. Even those readers who would find reading transfer to a second language made easier would lose greatly, along with many readers who would not gain that one advantage, because every stop-final morpheme in every dialect would have two spellings. Further, such an orthography selects for separate symbolization exactly those sets of allophones which are clearly united in all the dialects studied. Thus nothing is gained toward a common orthography that might help bridge the gap of non-congruity or discontinuity of phonemic patterns. The heterogeneous phonetic inventories and phonemic structures of Dani dialects are not well adapted to an orthography based on the phonemic system or orthographic tradition of Dutch, Malay or English.

4.2 THE FACTOR OF TYPOGRAPHICAL CONVENIENCE

Both economic and social considerations favor the use of available common symbols rather than special symbols, other factors being equal. Thus for the labio-velar phoneme /k^w/ the digraph 'kw' is adopted, since it involves only ordinary letters and entails no conflict with a sequence of phonemes represented by the separate letters. For the cluster /k^wk^w/ the simpler and unambiguous spelling 'kkw' is recommended.

More significant are the problems involved in writing seven vowels and, in some dialects, eight stop phonemes besides the labio-velars.

Four possible solutions for using common symbols to write the vowels have been examined: (1) Diacritics could be used; the symbols 'ɨ' and 'ʉ' might be used, for example, for the high close vowels. Such added marks tend to be forgotten by new readers, might be confusing if a diacritic is also used to mark secondary independent stress or other macrophonemic features, and are not used in any of the possible second languages. (2) Digraphs could be used for two of the vowels. Dutch employs digraphs, but those used for high vowels, 'ie' and 'oe;' are not desirable for Dani, since at least the second of these sequences of vowels occurs. A more attractive pair of digraphs would be 'ij' and 'uw' for the high close vowels, even though the first of these occurs in Dutch with a very different phonetic value. This spelling would give larger sequences of consonant symbols, which are often difficult to read. (3) Unused consonant symbols could be used for two vowels; 'y' and 'v' have both been used elsewhere as vowel letters, and the former is still so used in Dutch and English. However, 'v' is now a consonant letter in both those languages. Further, morphophonemic changes within single dialects like LGV, and correspondences between dialects, particularly when a five vowel system like that of WV is involved, show frequent replacement of /i/ by /ɪ/ and /u/ by /ʊ/; thus pairs of symbols somewhat resembling each other make recognition of morphemes easier. (4) Special common single vowel symbols can be used, and this seems the most desirable solution. Two sets are available: upper case 'I' and 'U' are on typewriters, and small capitals or italics of these letters are common in printers' fonts. The use of upper case letters for proper names or sentence initial letters makes small capitals or italics a less confusing choice for local readers.

Upper case letters can be retained for convenience in typewritten material, and the special symbols used in printed material.

The problem of representing three series of stops has similar possible solutions. The possible digraphs of apostrophe with voiced stop symbols, ' 'b' and ''d,' would cause ambiguity in WV, where the sequence of glottal stop plus /ɓ/ contrasts with /ɓ/. Only slightly less confusing are digraphs in the reverse order, 'b'' and 'd'.' The use of the simple symbols 'b' and 'd' for the implosives is not recommended, for all dialects which have implosives also have two other series of stops, for one of which the graphs 'b,' 'd' and 'g' appear most convenient. It appears most advantageous to use special symbols parallel to those used for the vowels. Upper case B' and D' can then be used for convenience in typing, and italic or small capital letters can be used in printed material. Of the two possibilities in printed script, the small capitals would have the advantage of greater resemblance to the typed capital letters.

Typographical convenience as well as conformity to other orthographic traditions recommends the use of punctuation marks for writing macrophonemic units. A proposed system is outlined in section 4.4 below. Not all macrophonemic contrasts must be symbolized; some have a minimal functional load and can be omitted with little loss in intelligibility. For example, the secondary independent stress might be symbolized with a diacritic but can be omitted from the orthography without introducing ambiguity in any known case. Similarly, contour and sentence stress can be omitted from an orthography for local readers without great difficulty.

4.3 THE FACTOR OF THE PHONEMIC PATTERNS OF OTHER DIALECTS

The principle that an orthography useful for several dialects is preferable to one useful only in one dialect has important implications for this study. The skewed phonemic pattern of LGV indicates that an orthography based on that dialect alone would be of limited value in other areas. On the other hand an orthography for BV, for example, would be very difficult for new LGV readers, who would have only one /h/ to represent four BV phonemes word initially. This loss of contrast in LGV is coupled with development of new contrasts between what are allophones of single phonemes in BV. If sets of allophones are separately symbolized on the basis of their occurrence in contrast in other dialects, not in the trade language, and symbols kept constant for these corresponding allophones and phonemes in the various dialects regardless of their phonetic values, it is possible to develop local orthographies which make cross-dialect comparison and reading maximally easy.

A review of chapters two and three indicates that the PD voiced stop series is not broken up in LGV, although it is fused with remnants of the PD aspirate and implosive stop series. Even on data from LGV alone, most of the LGV correspondences of PD voiced stops can be determined; these include all LGV word initial stops and all LGV word medial phonetic unaspirated stops or phonemic geminate clusters of stops for which there is no alternate pronunciation with a phonetic aspirate stop or phonemic cluster of stop plus /h/. If these correspondences of PD voiced stops are symbolized with 'b,' 'd,' 'g' and 'gw,' no phonemic contrast is obscured and the LGV reader finds words spelled very similarly to the

way they must be spelled to represent the phonemic contrasts present in other dialects. Practically no spelling problem is created, either, for the selection of symbols is based on criteria involving phonetic difference audible to the outsider and the free variation of contrastive phonemes, obvious to the local speaker. Further, since this orthography conforms to the historic pattern of the language, it does not necessitate two spellings for extensive lists of morphemes with only one phonemically written allomorph, as the separate symbolization of the voiced intervocalic allophones would require. In other dialects like BV certain allophones of the aspirate stop phonemes may be separately symbolized because of their contrastive occurrence in AV or LGV; thus [h] allophone of /k/ and [s] allophone of /t/ may be written separately there.

It has been suggested that when motivation to read becomes strong enough for Dani speakers, a cross-dialect orthography, loaded with the impedimenta of digraphs but representing all the major phonemic contrasts in the known dialects, is possible.[3] Materials in such an orthography could be prepared only by someone familiar with all the dialects, or at least representative dialects with the main types of phonemic patterns. Such a system has been worked out for the consonants, but further study of vowel correspondences is needed. Correspondences of PD */ b, d, g, g^w/ might be written 'b,' 'd,' 'g,' and 'gw.' Correspondences of PD */p/ represented in AV and LGV by [h] and /h/, respectively, might be written 'ph.' Correspondences of PD */t/ represented in AV and LGV and probably GD by /s/ might be written 'ts.' Similarly, correspondences of PD */k/

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[3]Encouragement that such an orthography is possible and many of the suggestions for representation of correspondences came from William A. Smalley of the American Bible Society.

paralleled in LGV by /h/ might be written 'kh,' and the correspondences of PD */k^w/ also represented in LGV by /h/ might be written 'kwh.' Last, for the stops, correspondences of PD */β/ represented in LGV and GD by /h/ might be written 'Bh' or with a small capital replacing the upper case letter. In the second table in Appendix B a number of words are given in their BV form in BV phonemic orthography and the suggested interdialectic orthography and in LGV form in LGV phonemic orthography, the rejected allophonic orthography which symbolizes voiced intervocalic phones separately, and the suggested LGV local practical orthography.

The eventual practicability of this kind of cross-dialect symbolization of allophones which are in contrast in any of the dialects depends on a number of factors which are not now known. If reading becomes a skill with a high value in the local cultures, the difficulties inherent in such an orthography could doubtless be overcome so that more people would have more materials available for their reading. It is highly improbable that any large quantity of booklets or books can or will be produced for each local dialect. However, it is extremely improbable that a single set of materials for all the dialects discussed would be adequate, inasmuch as the more distant dialects in terms of geographic separation are not mutually intelligible with most of the Grand Valley dialects. The Western Dani area seems fairly homogeneous, but a series of isoglosses in phonemic structure, grammatical structure and vocabulary separate those dialects from the upper Grand Valley areas, although speakers along that border can understand each other. Speakers of LGV, AV, BV and probably GD and MH cannot understand WD speakers, and WV speakers have difficulty getting the gist of a recorded narrative in LGV. At present it appears that at

the very least two sets of materials will be required, one for the WD area and one at least for the Grand Valley dialects. It may be noted that speakers of BV and AV can apparently be understood quite well both in WV and KV areas and in the LGV area. Further study of degrees of mutual intelligibility of what have been non-committally termed dialects, and future observation of the growing desire to read in these areas must determine the ultimate usefulness and limitations of cross-dialect orthographies for Dani.

4.4 A PRACTICAL LOCAL ORTHOGRAPHY FOR LGV DANI

The practical orthography recommended for LGV Dani in consideration of the factors of trade language orthographies, typographical economy and the structure of other dialects includes 'b,' 'd,' 'g,' and 'gw' for word initial stops and word medial phonetic stops where no alternate pronunciation with phonetic aspirate stops occurs; 'p,' 't,' 'k,' and 'kw' for other occurrences of the stop phonemes; 's,' 'h,' 'm,' and 'n' as in the phonemic orthography but 'ng' for the velar nasal; 'w' and 'j' as in the phonemic orthography; 'I' and 'U' in typescript, with small capitals in printed material, for the high open vowels, and 'i,' 'u,' 'e,' 'o,' and 'a' as in the phonemic orthography. Glottal stop may be written with apostrophe but only word medially; other occurrences are linked with terminals of macrophonemic units and may be omitted. A practical alphabet may anticipate morphology in representation of the macrophonemic units and their terminals. Periods may represent sentence terminal and any downgliding contour to level four except from level one. Question marks may indicate sentence terminal and any upgliding or level contour

ending with level two. Exclamation points may indicate sentence terminal and any downgliding contour from level one, and question marks followed by exclamation points may mark sentence terminal with any upgliding contour to level one. Exclamation points followed by commas may indicate downgliding contours from level one to level two or from level two to level three. Commas may mark plus or zero contour terminal not at sentence terminal with a contour ending in level three. Commas with following exclamation points can represent plus or zero contour terminal not at sentence terminal, with an intonation contour with final level one. Semicolons may be employed to mark plus or zero contour terminal not at sentence terminal and intonation contours with final level two. Periods followed by commas may mark plus or zero contour terminal not at sentence terminal and a level four contour. Colons may indicate added length occurring with any terminal and may be written before the symbol for that terminal. This representation of macrophonemic units and terminals is suggested for publishing of materials for local Dani readers and texts for non-linguistic investigators. The symbolization of the segments suggested at the beginning of this paragraph is recommended for all materials for cross-dialect studies. Phonemic orthography is recommended only for synchronic linguistic descriptions of LGV.

A local narrative is presented in Appendix C in the phonemic orthography developed for LGV in Chapter III, then a section is repeated in the practical orthography suggested here. A comparison of these systems there and in the tables in Appendix B will indicate the value of the latter; this practical orthography makes cross-dialect comparison and reading much easier by separately symbolizing allophones which are united in the skewed phonemic pattern of LGV but are phonemically contrastive in other dialects.

4.0 SYMBOLIZING A SKEWED STRUCTURE

The development of an orthography for the lower Grand Valley phonemic system has illustrated the problems presented by the non-congruence of that system with others in neighboring areas and with the common parent structure. Purely phonemic writing, as suggested in Chapter III, would require perhaps three different alphabets for the three major types of Dani consonant patterns and would leave uniquely divergent LGV with an alphabet which makes comparison with other dialects maximally difficult. Phonemics might be abandoned and allophonic orthographies be adopted which would write separately the major articulatory types of stop allophones, although the possibility has not been examined in this chapter. Such orthographies could be adjusted to make cross-dialect reference easy and would provide for some of the dialects an eased transferrence of reading skill to a second language. That solution would, however, add unnecessarily to the initial difficulty of reading by multiplying symbols and requiring two or more spellings of many morphemes which are phonemically identical. Orthographies might be adjusted to write separately only those allophones which are contrastive in the trade language. In the phonemic systems of Dani dialects, however, phonetic difference and phonemic pattern divergence are so pronounced that separate alphabets, each writing closely united allophones with distinct symbols, would be required for most of the studied dialects to provide maximum correspondence to the alphabet of some unrelated trade language.

The type of orthography which has been proposed here writes some allophones with separate symbols, but selects those allophones on the basis of their contrast in related dialects. How many of the Dani dialects

can be included in a single orthography will not be known until a further study is made of dialect differences and reader motivation. The local orthography proposed for LGV is usable by the speaker who knows only that dialect, yet it eases his transfer to reading of the other dialects. Reading as a new skill is not made very much more difficult than with a phonemic orthography, and the minimum number of translations or productions of written materials is made available to the maximum number of readers. For local speakers and outside investigators, the proposed local orthography for LGV helps minimize the skewness of that phonemic pattern as a barrier to cross-dialect comparison and reading.

CHAPTER V

CONCLUSION: TOWARD A COMPARATIVE STRUCTURAL APPROACH TO LINGUISTIC AND CULTURAL DATA

The dialect of the lower Grand Valley of the Baliem exhibits what is for Dani a unique consonant pattern, with only one set of stops and two voiceless continuants as major correspondences of three sets of stops in proto-Dani and some other extant dialects, and two sets of stops in all other studied dialects. Loss of contrast in some cases, development of contrast in others and a general reshuffling of allophones have produced this marked skewness or non-congruence of phonemic pattern. To facilitate cross-dialect comparison by outside investigators and cross-dialect reading of the local speakers, an orthography based on comparative and diachronic data as well as synchronic descriptive data has been proposed. This symbolizes all phonemic contrasts in the skewed dialect and also selects for separate symbolization some allophones which are in contrast in other dialects. In the local orthography for one dialect only those allophones are separately written which can still be recognized on phonetic and phonemic criteria by the person familiar with only that dialect. Future study of mutual intelligibility of dialects and indications of high reader motivation may warrant extension of this principle by the use of a cross-dialect orthography which would symbolize all the major contrasts in any of the types of extant dialects. Both for description and for graphic representation, comparative and diachronic data have proved relevant to the study of a phonemic system which is askew with the systems of related dialects.

In other language situations with similarly heterogeneous data the principle developed should be applicable. To what extent it can be applied outside linguistics awaits study. An illustration from the cultures in the Dani area is perhaps suggestive. In lower Grand Valley and the gorge, cannibalism is occasionally practised, and it is reported to be common across the range in the mid-Hablifoeri area; people from middle and upper Grand Valley and the western Dani areas loudly denounce the very thought of eating human flesh. So the data might be reported by the outsider observing only differences which seem pertinent to him. The anthropologist interested in structural patterning in culture might observe that in some middle and upper Grand Valley areas, at least, exposure and mutilation of certain killed enemies are practised in similar situations and with similar significance to the cannibalistic occurrences in the gorge, but the cannibalism in the Hablifoeri appears from the scanty available data to be different in function. One could describe disparate whole culture patterns in the three cases, or group the two Grand Valley ones as including alternate manifestations of similar patterns but contrast with them the Hablifoeri pattern. This would make comparison of similar traits difficult and obscure the fact that non-cannibalistic locals easily group all those who practise eating human flesh in one category. If one describes upper Grand Valley exposure and mutilation as insult-exposure, lower valley cannibalism as insult-cannibalism and Hablifoeri cannibalism as just cannibalism, comparison is facilitated, and the contrastive systems of other areas are indicated as relevant to a description of any one.

Whether applied to data from language or from other areas of culture, the approach outlined in this study is different from two other possible approaches to the data. The first is what Kenneth Pike calls the etic approach, which selects for description and representation all differences which are perceptible to the investigator; phonetics represents this kind of approach to language data. Advanced from that approach is what he calls the emic approach, which describes differences in terms of the structural pattern and contrasts seen in the system itself; phonemics is the analysis of language sounds on this level.[1] This study of lower Grand Valley phonemic structure suggests that particularly in areas where related systems of behavior are divergent in pattern, an approach which includes structurally analyzed comparative and diachronic data is the most useful for description of any of the single systems involved. Such an approach is something more than emic; it goes beyond the individual whole language or culture pattern to a basis for comparison and relevant evaluation of that pattern in terms of other different patterns which have come from a common historical origin. This comparative structural approach to data epitomizes the thesis which has been developed. That was earlier stated in purely linguistic terms, that a skewed or non-congruent relationship of the phonemic pattern of one dialect to the parent dialect and other daughter dialects indicates the relevance of the study of those dialects to a description of and orthography for the aberrant system. In broader terms, when systems of data of common historical origin exhibit marked heterogeneity of structure, the divergent patterns of other systems are relevant to the description of any one.

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[1]Kenneth Pike, Language, Part I, section 2.

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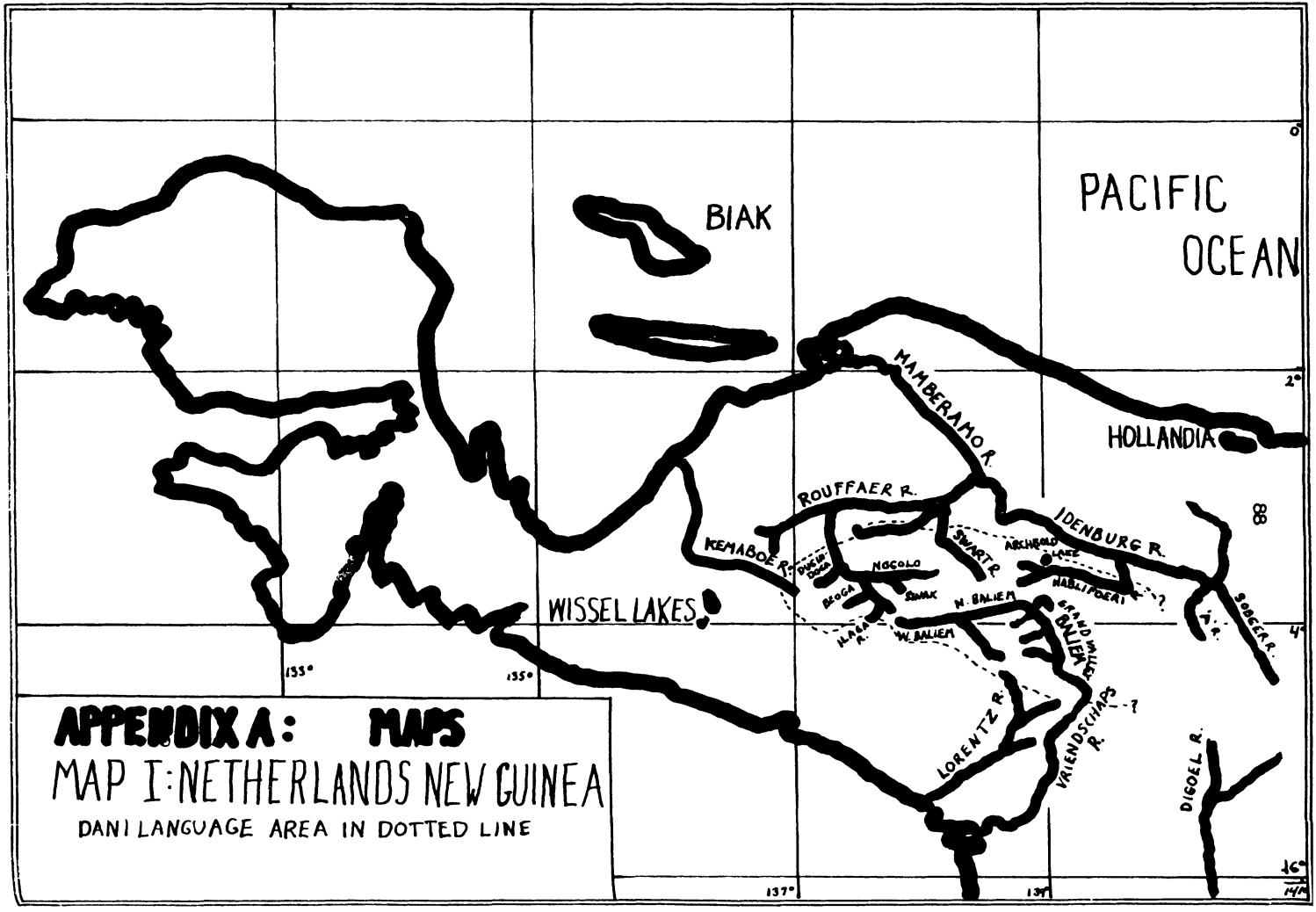
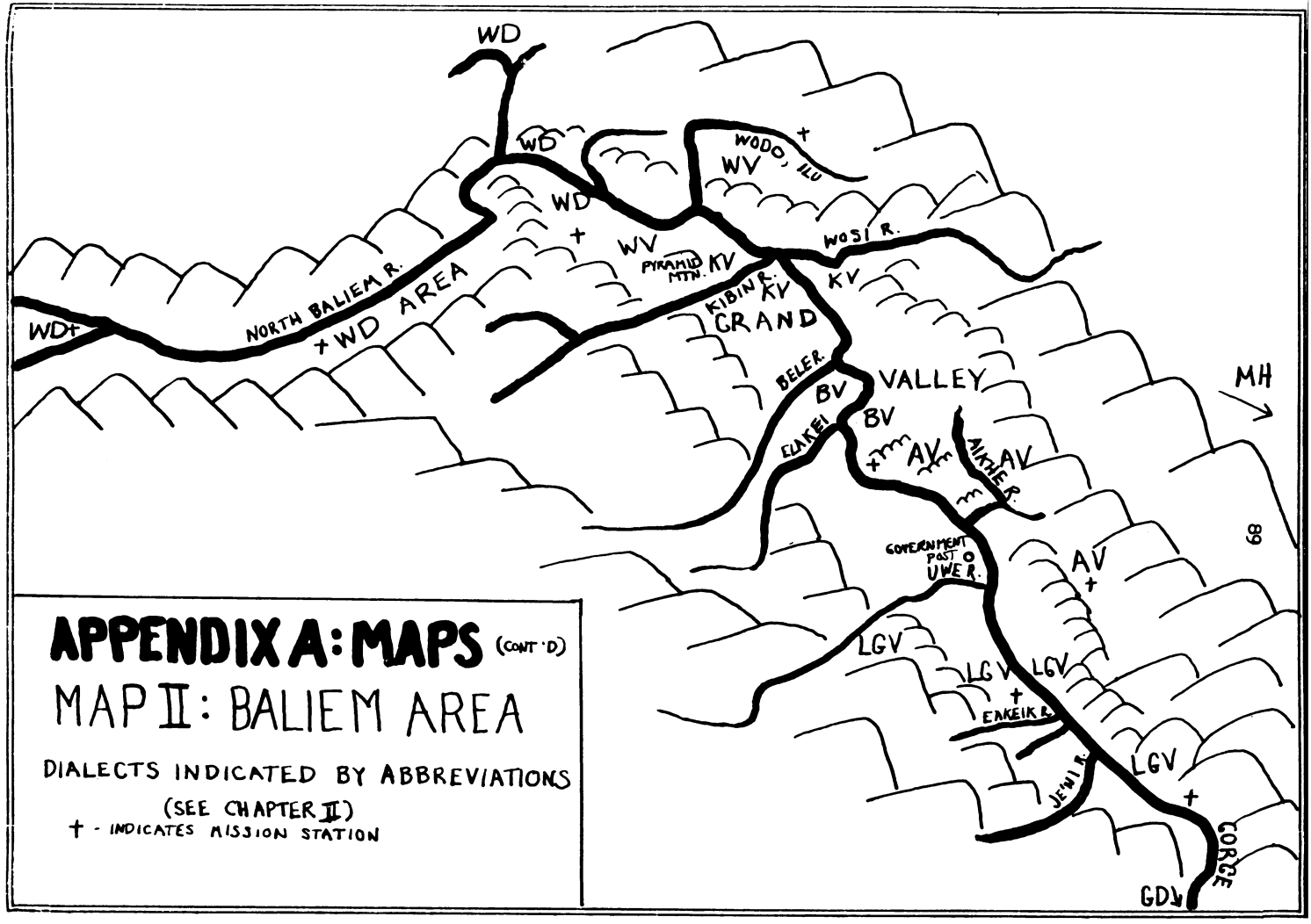


APPENDIX A: MAPS

MAP I: NETHERLANDS NEW GUINEA

DANI LANGUAGE AREA IN DOTTED LINE



APPENDIX A: MAPS (CONT'D)

MAP II: BALIEM AREA

DIALECTS INDICATED BY ABBREVIATIONS

(SEE CHAPTER II)

† - INDICATES MISSION STATION

APPENDIX B

TABLE X

PHONETIC DATA FOR SOME COGNATE FORMS IN THE DIALECTS STUDIED

Western Dani (WD)	Wodo Valley (WV)	Kibin Valley (KV)	Bele Valley (BV)	Aikhe Valley (AV)	Lower G. Valley (LGV)	Gorge (GD)	Mid-Hablifoeri (MH)
'two':							
^{m}b3r3	^{m}b3r3	^{m}p3r3	^{m}p3r3	p3r3	pɪr3	pɪr3	bir3
'his mouth':							
amb3	amb3	amb3	amp3	ap3	ap3	ap3	amb3
'mountain':							
—	^{n}dcm	^{n}tcm	^{n}tcm	tcm	tcm	tcm,dcm	dcm
'his name':							
3ndag3	3ndaga	3ndaga	3ntag3	3taga	3tag3	3dag3	3ndaga
'big':							
^{ŋ}gck	^{ŋ}gck	^{ŋ}kck	^{ŋ}kck	kck	kck	kck,gck	—
'seed':							
aŋg3n	3ŋg3n	3ŋg3n	3ŋk3n	3k3n	3k3n	3g3n	aŋg3n
'good':							
--	p^{h}anc	p^{h}anc	panc	hanc	hanc	hanc, panc ?	p^{h}anc
'my louse':							
nabɪ	nabɪ	nabɪ	nabɪ	nabɪ	nabɪ	nabɪ	nabɪ
'man':							
ap	ap	ap	ap	ap	ap	ap	ap
'bird':							
t^{s}c^{w}3	t^{sh}3w3	t^{sh}3w3	t^{sh}u3?	t^{sh}u3	su3	su3	t$^{}$su3, su3
'his hair':							
3ri	eri	esi	esi,isi	esi	esi	esi	esi
'you (sg.)':							
k^{h}at	k^{h}at	k^{h}at	hat	hat	hat	xat	hat ?
'its tail':							
ag3	aga	aga	aga	aga	ag3	ag3	ag3

TABLE X (continued)

(WD)	(WV)	(KV)	(BV)	(AV)	(LGV)	(GD)	(MH)
'no':							
l3k	ð3k	ð3k	ð3k	ð3k	l3k	l3k	313-k (ð occurs)
'woman':							
$k^{wh}3$	$k^{wh}3$	$k^{wh}3$	h3	h3	h3	$h^{w}3$	k^{h}ɪap ?
'his wife':							
?	$ag^{w}3$	$ag^{w}3$	$ag^{w}3$	$ag^{w}3$	$ag^{w}3$	$ag^{w}3$?	?
'wrong':							
p^{h}ʊk	ßʊk	ßʊk	ßʊk	ßʊk	hʊk	hʊk	?
'his son or daughter':							
ap^{h}ʊt	a'ßʊt	a'ßʊt	a'ßʊt	a'ßʊt	aput	?	?
'his pity for it':							
abʊa	a'ßʊ	a'ßʊ...	a'ßʊ...	a'ßʊ...	abʊa	?	?
'Baliem':							
^{m}balim	^{m}baɎ̇im	^{m}paɎ̇im	^{m}paɎ̇im	paɎ̇im	palim	balum	?
'rain':							
majʊ	miž̇c	misc	misc	meisc	mcsc	mcsc	—
'Let's go':							
nawck	lʊak	lʊak	lʊak	lʊck	lʊck	lʊck	—
'our feces':							
ninan	$nina^{d}$l	$nina^{d}$l	$nina^{d}$l	$nina^{d}$l	$nina^{d}$l	n3nal	$nina^{d}$l
'I know':							
n3nu	nelu	nelu	nelu	nelu	nelu	nclu	nelu
'I don't like it':							
	na'ɪt	na'ɪt	na'ɪt	na'ɪt	na'ɪt	na'ɪt	na'ɪt ?
'this':							
ži	ži	jɪ	jɪ	ji	jɪ	jʊ	?
'lie down':							
wencg3	wilarin	wilasin	wilasin	wilasin	$we^{i\tilde{}}$name	$we^{i\tilde{}}$name	?
'water':							
ži	i	i	i	i	i	ik, ji,i	ik
'put it down':							
p^{h}ʊ	ßin	ßin	ßin	ßin	$he^{i\tilde{}}$ñ	h^{w}eiñ?	?

TABLE X (continued)

(WD)	(WV)	(KV)	(BV)	(AV)	(LGV)	(GD)	(MH)
'cold':							
$t^{sh}cg^{c}\iota$	$t^{sh}cg^{c}i$	$t^{sh}cg\iota$	$t^{sh}cg^{c}\iota$	$t^{sh}cg^{c}\iota$	$scg^{c}e\tilde{i}\tilde{k}$	?	$t^{s}cg^{c}ik$
'my tooth':							
neak	naik	$na^{i}k$	$na^{i}k$	$na^{i}k$	$na^{i}\tilde{k}$	$na^{i}\tilde{k}$	$na^{i}k$?
'pain':							
--	u	u	u	u	$ou^{\flat}k$	?	?
'net':							
žum	t_{su}	t_{su}	su	su	su	su	?

TABLE IX

A COMPARISON OF SOME ORTHOGRAPHIES

Meaning of Form	Bele Valley Phonemic Orthography	Cross-Dialect Orthography	L.G.Valley Phonemic Orthography	L.G.Valley* pre-Dutch Orthography	L.G.Valley Practical Orthography
'two'	bete	bete	pete	pere	bete
'his mouth'	abe	abe	appe	appe	abe
'mountain'	dom	dom	tom	tom	dom
'his name'	edaka	edaka	ettake	ettage	edake
'big'	gok	gok	kok	kok	gok
'seed'	egen	egen	ekken	ekken	egen
'good'	pano	phano	hano	hano	hano
'my louse'	napɪ	napɪ,napI	napɪ	navɪ	napɪ,napI
'man'	ap	ap	ap	ap	ap
'bird'	tʊe	tsUwe?	sʊe	sʊe	sʊe, sUe
'his hair'	eti	etsi	esi	esi	esi
'you (sg.)'	kat	khat	hat	hat	hat
'its tail'	aka	aka	ake	age	ake
'no'	ðek	ðek	lek	lek	lek
'woman'	ke	kwhe	he	he	he
'his wife'	ak^{w}e	akwe	ak^{w}e	agwe	akwe
'wrong'	βʊk	βhʊk	hʊk	hʊk	hʊk, hUk
'his child'	aβʊt	apβʊt	apput	apput	abut +
'his pity'	aβʊ...	aβʊ, aBU	apua	avua	apua
'Baliem'	baðim	baðim	palim	palim	balim
'rain'	mito	mitso ?	moso	moso	moso
'let's go'	lʊok	lʊwok ?	lʊok	lʊok	lʊok, lUok
'our feces'	ninal	ninal	ninal	ninal	ninal
'I know'	nelu	nelu	nelu	nelu	nelu
'this'	jɪ	jɪ, jI	jɪ	jɪ	jɪ, jI
'lie down'	wilatin	wilatsin?	weiname	weiname	weiname
'water'	i	i	i	i	i
'put it down'	βin	βhin ?	hein	hein	hein
'cold'	tokɪ	tsokɪ	sokeik	sogeik	sokeik

TABLE XI (continued)

Meaning	BV P'mic	Cross-D'ct	LGV P'mic	LGV Pre-D.*	LGV Practical
'my tooth'	naik	naik	naik	naik	naik
'pain'	u	u ?	ouk	ouk	ouk
'net'	tu	tsu	su	su	su
'pandanus'	dukke	dukke	tukke, tukhe	tukke	dukhe

*This orthography, which writes the voiced intervocalic allophones with separate symbols, is rejected in this study but presented here for comparison.

+This is one of the relatively few places where the suggested practical orthography for LGV is actually misleading as to the historic shape of the form.

APPENDIX C

I. A SAMPLE TEXT IN PHONEMIC TRANSCRIPTION

```
     3 2:                3 2        3       3 20       3
1.  'ĭk-a.+   2. tɩ meaké-te+ welesí+ makkúm-he  welesí+ pʊ-jɩk-ke
                30    4        40 4
ta' ninom hanŏ-akaku.+  meaké tăk.+   3.  ninom laɩk waɩ' laɩk waɩk
                        3            3 2     3      3                  3
wete'ma wete'ma wete'má-nen+ lokolík-he+ 'áp+ wʊkhá-hʊpɩ'+ meake-nen tá'+
 30     20      4                        3                  30
múk-usa kĭ-akeikhe.+  4.  mukusek aik ɩlí-pakke+ 'uwe aik ɩlí-pakke
    4              3                  30                  3
mottók+ 'o halɩ hɩlík+ 'appʊnɩ inatík ki-akeikhesiken mekké-nen+
   3  2             30                        30                30 4
hopúk-he+ 'uwe aik ípakke wʊukha-hʊpɩ hoto jí-mekke muk-isasikhĕ-at.+
                30        3          30        30                4
5.  muk-usikhenén nit jomá-nen+ meaké-nen lɩpakén-mekkenen mottók+
                        3 20      4       3        2        3     30    4
watɩk watɩk watɩk watík-he mottók+ 'o múk-hoko-te+ 'okkɩlík+ lɩăk-sesukha+
     4       30                30                  30       4
6.  nén epe'nák^w-k^we lɩpaken ɩlík-ke waletakama lɩăk-sesukha.+
     3          2                        3   4          3         2
7.  lɩák^w-sɩlɩk-he'+ hʊpɩk-kia' ninom hanŏ-ako.+  8.  hanó-akosik-he+
                                3       30       3    3      30         4
laɩk waɩ' laɩk waɩk welakeikhasík-en+ 'ít-en hopúk+ nít+ pɩtĕ ninathukha.+
                3     2         3          3              3      20
9.  ninattukhá-mekke+ welakosík-en'+ ninóm+ hopu' ninajúk-en-he nit joma
     3   3     20                              3          3   30
wete'má+ nít-en-he inathɩ'-lekat wete'ma wete'má-nen+ hopúk káin-mekke
     3        4                  3 2            3   2                3  2
akeikhĕ+ ninatha.  10.  ninattukhamá-nen'+ nina'lúk-he'+ sʊe-atek wolók-he
                    30       4          30       40    3    2       2
+ hʊpɩk-kiak ete'mă lakoukha.+  11.  nít-ɩ mottók hʊpɩk-kiá'  meaké+
        20      4              4 20   4  2     4
mottok kĭ-akeikhe.+  12. lɩpakén- mekké mottók+ lappuk happuk-hoko
                3  20  3                                3  2        30
ki-akeikhesi'mó-nen nít+ hoil sal hɩlɩk wʊlɩphɩ lokolík-he+ hinakĕn
     4                3  20        30      4                3
wattuku.+  13.  wattɩlík-he sekkelokŏ nasuku.+  14.  nʊkkʊném-en'+
   3                                3                   3  2       3
nalók-en'+ meake-a'noko aten elomá'+ka kamo ikha lakʊném-en lɩpakén-mekke+
     30                            3 20                          3  20
lɩpakén-mekke nít+ 'ettaɩ wattɩlík-he ninekki akeikhe welakosík-he ninekki
     3        2                    30      4            2    20   30  4
akeikhén-en-he'+ lɩpaken helen-hokŏ wattuku.+  15.  hɩmí'+ 'áp pakkĭ-at+
   3                    3  20    3                              3 20
hɩmí'+ hɩnaken wattukusík-en hopúk+ 'ap kain akeikhe wattukú-nen weim
                30        3                    30    4                3
jappu jappu jappú-nen hopúk-en'+ heleŋ-hoko mŭk-isoko.+  16. wamatʊé-nen'+
```

3 4 4 4 3
'akeikhĕ'+ wathe.+ meakĕ-mekke.+ 17. watteném-en'+ wamatue nit-etekke
3 2 3 3 3
akasik watteném-he+ 'ít+ 'eilelek^{w}k^{w}é-lak+ lɪó-lakenek+ 'apané-mel-nek+
30 4 2 10 30 4
mŭk-isoko.+ 18. helén-hoko mŭk-isoko.+ 19. muk-hokosoko pukima
30 4 3 2: 30 4 40
kelăk-soko.+ 20. makkúm-he+ wukha-hupɪ ta' muk hă-sikhe.+ 21. nén
3 2: 30 4 4 4 30 4
hopúk-he+ lɪpaken mŭk-isoko.+ 22. 'attĭ.+ 23. nakeikăk.+ 24. 'ăt-at.+
30 4
25. hăl-la-ok.

II. A SELECTION FROM THIS TEXT IN LGV PRACTICAL ORTHOGRAPHY

12. LIpaken;mege; modok., labuk habuk-hoko gi-akeikhesi'mo-nen; nit, hoil sal hIlIk wUlIphI lokolIk-he; hinaken, wathuku. 13. WathIlIk-he; segeloko, nasuku. NUkhUnem-en, nalok-en, Meake-a'noko aten eloma, gamo ikha lakUnem-en; lIpaken-mege, lIpaken-mege, nit, edaI wathIlIk-he; ninegi akeikhe welakosik-he; ninegi akeikhe-nen-he; lIpaken helen-hoko, wathuku. 15. HImI; ap; bagI-at., hImI, hInaken wathukusik-en; hopuk, ap gain akeikhe wathuku-nen; weim japhu japhu japhu-nen, hopuk-en, heleng-hoko muk-,isoko. 16. WamatUe-nen, akeikhe, wathe. Meake-mege. 17. Wathenem-en, WamatUe nit-etege akasik wathenem-he; it, Eilelekhwe-lak, LIo-lak-enek, Apane-mel-nek, muk,-isoko. 18. heleng-hoko,! muk,-isoko.

III. TRANSLATION OF THE TEXT

1. Shall I speak? 2. About that, about the Meage, at Welesi, originally up this direction at Welesi we first came on good terms. That was with the Meage first. 3. After we had gone and come, gone and come between our groups for some time, after a while, the Wuka-hubi men were first invaded and driven out by the Meage. 4. Having driven them out on the other side of the stream, on the other side of the Uwe, burning all the

villages and killing the people as they invaded, later on they invaded and drove out the Wuka-hubi close here on this side of the Uwe. 5. When they drove them out we locals and the Meage and the folks across the river joined them, killing and killing and killing, and having chased them out of their villages, we drove them up to Okilik. 6. Then others we drove up the other side of the river in that direction to Waleragama. 7. Having driven them up there, we came on good terms with the Hubi-kiak. 8. Having come on good terms, after people had been going and coming, going and coming, later they killed two of us. 9. After they had killed us, after a while, while we were later afraid and were here, and we had not killed any of them, later on they killed another important man of ours. 10. When they had killed [that man of] ours, having killed us, they carried the 'dead bird' to the Hubi-kiak area. 11. The Hubi-kiak and Meage all invaded us here. 12. When the folks across the river invaded all tightly joined with them, we set an ambush, and while we were coming out, we killed three. 13. Having killed, we cut them up and ate them. 14. When we ate them, having eaten them, when those Meage remained away off there, after we had danced the victory dance, then after another day, on the next day we killed the group across the river. 15. When we had killed women--one man and three women--later after we had killed an important man as well and had fought and fought and fought, we drove them all out. 16. Pig's-bird killed one, a Meage man. 17. When he killed him, when he came on our side and killed, we chased just them out: Eilelekwe and his group, Lio and his group, Abane and his group--just those. 18. We chased them all out! 19. Having chased them out, we drove them into Pugima. 20. In the beginning,

[the Hubi-kiak] first chased out the Wuka-hubi. 21. Then later on we drove out the people across the river. 22. That's it. 23. My friend. 24. It's finished. 25. Greetings.