The Ok Language Family in New Guinea

Author's Notes—2009

Ok languages (pp. 38–45) and Map 1:
In the years of field work following the writing of this thesis, several changes were made to the list and map of Ok languages.

- Kauwol was renamed Wopkei and was extended to the south-east to meet the boundary of Faiwol (thus diminishing the area of Tifal).
- There was still no linguistic data on Iwoer. Was it really a separate language and how does it relate to the six surrounding languages?
- The names and locations of Trans-Strickland and Kowan were deleted; they are not Ok languages (Healey 1970:1039, 1059 note 7).
- The boundary between Ngalum and Tifal was moved about 8 km to the west, just over the Indonesian border.

More recently, Voorhoeve (2005:147) has identified Tsakwambo as an additional Ok language located south-west of Ngalum.

Data on individual languages (pp. 45–76):
During the 45 years since this thesis was written, much more and much better data has been gathered by others about the Ok languages and is increasingly becoming publicly accessible. For example, a bibliography of traditional publications by SIL staff is available at www.sil.org/pacific/png, and additional materials are currently being made available online at the same site.

Neighbouring language families (pp. 108–117):
The relationship of the Ok family to the Awyu-Dumut family is further explored in Healey 1970:1005-1006 and in Voorhoeve 2005:165.

Ok proto phonologies (pp. 127–132, 168–169, 181):
Voorhoeve (2005:150–152) has proposed systems of phonemes for Proto-Mountain Ok and Proto-Lowland Ok, and consonant phonemes for Proto-Ok.

References:
Healey, Alan, 1970, Proto-Awyu-Dumut phonology. In S.A. Wurm and D.C. Laycock, eds, Pacific linguistic studies in honour of Arthur Capell, Pacific Linguistics, Series C, No. 13, 997–1063.
Voorhoeve, Bert, 2005, Asmat-Kamoro, Awyu-Dumut and Ok: an enquiry into their linguistic relationships. In Andrew Pawley et al, eds, Papuan pasts: cultural, linguistic and biological histories of Papuan-speaking peoples, Pacific Linguistics 572, 145–166.

Alan Healey
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The OK Language Family

in

NEW GUINEA

Thesis submitted for the Degree of

Doctor of Philosophy

in the

AUSTRALIAN NATIONAL UNIVERSITY

By

Alan Healey

September, 1964

Acknowledgements

I will always be indebted to those who have taught me linguistics. Dr K.L Pike trained me in the rigours of phonemic and tonemic analysis, and also introduced me to the Teléfól language. Dr R.S Pittman introduced me to comparative linguistics, and Dr Isidore Dyen, by his writings and correspondence has encouraged me to pursue the subject further. Dr A. Capell and Fr P. Drabbé, by their writings, have given me a grasp of how some New Guinea languages are structured. Dr M.Van der Borght has patiently tried to teach me Dutch, and has ever been ready to advise on the choice of words in the tables of Chapters II and III. Dr S.A Wurm, my supervisor, has broadened my understanding of general linguistics and New Guinea languages, and has been an encouragement in the times of analytical despair.

In New Guinea field work was possible only through the wholehearted co – operation of many linguistic informants. I especially wish to thank Máákkis (Tiínokál) and Miyoméngaal (Ilinokál) who so patiently taught me Teléfól. I am indebted to Administration Officers, missionaries, and colleagues of the Summer Institute of Linguistics who supplied word lists and maps, but who cannot be named individually because they are so many. The hospitality of Assistant District Officer H.E Clark and Rev. K Bricknell made the study of the languages around Kiunga and Oksapmin both possible and enjoyable.

Drs S.A Wurm and D.C Laycock have carefully read earlier drafts of this thesis, and have been generous with their advice and time. My wife has been my constant critic and inspiration, and unsparingly read proofs and cut stencils. The Linguistic Circle of Canberra was kind enough to publish Chapters I and IV in time to be bound in the thesis. These have been repaginated, with the original pagination in square brackets. Finally, I am grateful to the Australian National University for the Scholarship, field grants and facilities that have made the writing of this thesis possible.

Alan Healey
Canberra
18th September, 1964

This work is based on original research except in the following points:

(a) Chapter I includes a bibliographical review of informant techniques and careful acknowledgement is made of the source of all methods that were not used in my own field work.

(b) Chapters II and III include both published and unpublished information on many languages from other authors, and these sources are fully acknowledged in section 1 of Chapter II. The information on Angkiakmin (Faiwol), Bimin (BH), Miamin, and Ninggirum was gained solely from my own field work.

(c) The information on Teléfól is the result of field work and analysis carried out jointly with my wife, Phyllis M. Healey. In the field, I elicited the data from informants while my wife abstracted this data into extensive lexical and syntactic filing systems. The lexical file was the starting point for checking my analyses with informants in the field and has been the source for most of the Teléfól data in this work. The analyses of the data in this work are mine, but in presenting them I have been constantly indebted to my wife for her constructive criticism.

(d) My wife was responsible for the clerical labour involved in Tables 1, 2, 6 and 7 of Chapter II.

Alan Healey
18th September, 1964

INTRODUCTION

At the hub of the island of New Guinea a population of some 50,000 people scattered over a remote area of about 11,000 square miles speak between them at least 10 languages belonging to a single linguistic family. This group of languages has here been called the Ok Family, following a remark by Dr. Capell concerning the widespread use of the word ok for 'water' or 'river', as may readily be seen in maps of the area.[1]

The first materials published concerning the languages of this family were the word lists collected by Leo Austen for Southern Kati, Northern Kati, Yonggom, Ninggirum, and Faiwol from 1922 onwards.[2] However, because of the inaccessibility of the area, little more became known of these languages during the next 25 years. It was not until 1949 that the idea of a family of languages was first put forward by Dr. Capell.[3] Since that time, intensive patrolling by officers of the Dutch, Indonesian, and Australian administrations has now made almost all of this area accessible to those interested in linguistic research. Although the information available for the north-western area is rather scrappy, the time seems ripe to undertake a survey of the languages of the Ok Family.

The primary aim of this thesis is to give a brief account of the Ok languages individually and comparatively, and to show that the methods of comparative linguistics first established in Indo-European studies can be profitably applied in studying the

interrelationship of the Ok languages and in reconstructing some of the probable linguistic features of the parent languages (Proto-Mountain-Ok, Proto-Lowland-Ok, and Proto-Ok).

A secondary aim is to illustrate in detail the phonological structure of a typical Ok language. The Teléfól language has been chosen for this purpose for three reasons. (a) It is the language in which the author did the bulk of his field work. (b) It belongs to the Mountain-Ok Sub-Family, whereas the only published description is that by Drabbé of the two Kati languages in the Lowland-Ok Sub-Family.[4] (c) It is typical of the more numerous Division A languages within the Mountain-Ok Sub-Family. In describing Teléfól the emphasis is upon its phonological structure, since Drabbé dealt mainly with the morphology of Kati rather than its phonology.

The plan of the thesis is self-evident. It commences with a statement of the author's techniques for collecting linguistic data in the field, and these are compared with methods that other field-workers have used. Next the Ok languages are surveyed, and the internal and external evidence for their coherence as a family is presented. A preliminary attempt is then made to reconstruct the proto-phonemes and some of the proto-morphemes of the parent languages. Finally, the linguistic features of the Mountain-Ok are exemplified by a detailed account of Teléfól phonology. The author's wife, Phyllis M. Healey, hopes to present as her thesis a study of Teléfól syntax.

Notes follow each chapter.

NOTES

1. Capell 1954: 52. See the maps in the pocket at the back of this volume. These are based upon the following maps:

(a) Australian Geographical Series, First Edition; 1 : 1,000,000 -- Fly River 1962, Hollandia 1961, Lae 1960, Torres Strait 1958.

(b) New Guinea Border (Special) Reconnaissance Map, Second Edition, 1 : 1,000,000 -- sheets 3 to 7, 1964.

(c) Topographical map of the Star Mountains area and a part of Fandobo and Muyu Districts, 1 : 2,300,000, in Reynders 1962: 71.

(d) Various maps in Brongersma and Venema 1962, Behrmann 1924, Austen 1923 (b), Campbell 1938, and Champion 1932.

(e) Patrol maps and the author's aerial observations.

The language boundaries are based upon the sources mentioned in notes 1 - 22a, 78 of Chapter II of this thesis. Salzner 1960 and Loukotka 1957 were consulted but rarely followed.

2. Austen 1922, 1923 (a), 1925, 1926.

3. Capell 1949: 374. However, Austen had previously noticed that Yonggom and Ninggirum are related languages. Austen 1923 (b); 347.

4. Drabbé 1954: 146-229.

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Linguistics, Department of Anthropology and Sociology,
The Australian National University

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HANDLING UNSOPHISTICATED LINGUISTIC INFORMANTS[1]

0. INTRODUCTORY NOTE

This paper describes the author's methods of handling unsophisticated informants while investigating the Teleéfoól language spoken by about 4000 people in the vicinity of Telefomin, Territory of New Guinea.[2] The discussion includes several aspects of field methodology that have received scant attention in the literature to date: linguistic surveys, pair testing for phonology, monolingual informants, and the uses of tape recorders.

1. GENERAL APPROACH[3]

To foster and maintain good relations with one's (potential) informants is an essential part of field work. One needs to be alert for any indications of offence or embarrassment. It is only courteous to respect their dignity, self-respect, feelings, opinions, beliefs, and customs. Despite the social stratification resulting from native-European interaction, I believe that it is both right and far-sighted to treat one's informants as equals in every way possible. I personally feel that I should sit on a log in the shade to work with an informant if that is the way he is most comfortable, rather than insist on using a table and chair in my house. A clip-board for notepaper is an asset when working without a table.

An early and vigorous attempt to learn and speak the vernacular is the best demonstration of the sincerity of one's interest in the vernacular. At Telefomin I started by learning to use the rather involved system of greetings and farewells, with the result that people who usually showed no interest in Europeans became quite friendly and interested in my efforts. In fact, if one's study of the vernacular is to extend more than a few weeks, then conversational fluency in the vernacular is invaluable to grammatical investigations and worthy of top priority for the first few months of field work. A tape recorder can render considerable aid in gaining conversational fluency.

Field workers who commence their studies in a monolingual situation, in which there is no intermediate language used in their contacts with the community or informants, are at a considerable advantage in achieving the goal of conversational fluency.[4] It has been my bitter experience that knowledge of and leaning upon a trade language in the early stages of field work sets habits that are not easily broken, and the goal of conversational fluency may be indefinitely postponed.[5] To overcome this problem some linguists have suggested that before a field worker commences his studies in a given language he should be

provided with an elementary sketch of the language - phonemic contrasts, pronouns, tenses, simple sentence structure, useful questions, short useful vocabulary, and perhaps a short tape-recorded language course - such as could be prepared from previous workers' materials or by an experienced linguist working on the language bilingually for a week or two.[6] The initial boost that this material would give the field worker toward his goal of conversational fluency would allow him to by-pass the initial period of frustratingly inadequate communication experienced in an ordinary monolingual situation, thus doing away with the need (or temptation) for him to settle in a community where the trade language is well known, and where his chances of gaining conversational fluency are so much poorer.

An important condition for conversational fluency is adequate opportunity to hear and participate in conversations with as many different people as possible. This may best be achieved by living in a village, or right beside the largest hamlet in an area, or on the busiest road in an area at a place where people stop for water or shade, or close to a place where people gather daily. Alternatively, conversational practice may be gained by daily visiting places where there are lots of people, taking short trips with people, or sharing in people's various tasks - in such a way as not to hinder their work for an employer or for subsistence. In such conversational practice it is good always to mimic new words and utterances at *full speed*. When away from home for more than an hour or so I make a practice of taking a small note-book and ball-point pen to note down new expressions. However, on shorter absences I prefer to take no notes, and make it a special mental discipline to remember the four or five most interesting new expressions till I arrive home and can note them down and later check them with an informant. In this way they are usually well fixed in the mind.

It is good to come to an agreement with the informant about rates of pay right at the beginning. It is appropriate for an informant's wages to be slightly higher than the locally accepted standard for an unskilled labourer, because of the greater prestige involved and because unsophisticated peoples often consider sitting down answering questions harder work than physical labour. The informant deserves payment, not for the hours he spends with the linguist, but rather for the hours he spends away from his means of livelihood. At Telefomin, a man who spends his mornings at informant work is often away from his agriculture for a whole day, because of the considerable distance of the taro-gardens from the villages and because rain regularly prevents him from gardening in the afternoons. In this case I feel responsible for a whole day's wages. Formal arrangements may not always be made with casual informants, but gifts (especially in kind rather than cash) are always appropriate. Some anthropologists warn against paying directly for the quantity of information or texts that an informant supplies, and against paying such a high wage as to embarrass

other field workers who come to the area in the future.[7]

Sessions are best arranged to suit the informant's daily routine, and the field worker should be punctual. Lack of promptness gives the impression that the field worker doesn't really value the informant's help, but considers himself superior to the informant and thinks nothing of keeping him waiting while he trivializes. The length of sessions varies with the informant, but one hour seems to be the maximum advisable. Breaks of at least 15 minutes are necessary between sessions. Often one half-hour session is all that can be expected from casual and "bush" informants.

Usually the best situation is just one informant at a time, of the same sex as the field worker, and over 15 (preferably 20) years of age. In some areas it is socially acceptable for a single woman field worker to employ a male informant, and in other areas it is not acceptable. When two informants are used simultaneously, any friction between them is likely to detract from the linguistic value of the session. To avoid friction it is important to use informants from the same village or clan to ensure their dialectal uniformity, and it is advisable to interrogate them with meticulous alternation. In some social situations it may prove necessary to have two informants - an intelligent young man acting as spokesman and an old man of some status and experience acting as censor and consultant.[8] Employing the one person for both household service and regular informant work may not be very satisfactory. He is often needed for both tasks at the same time. He tends to get tired, and a sleepy informant is completely unreliable. The linguist finds it very difficult to maintain two kinds of inter-personal relationship to the same person simultaneously - a distant disciplinarian and a friendly co-worker.

It is necessary to explain to each new informant, especially casual ones, what one is doing and why. If a tape recorder is used it is essential to demonstrate it first with one's own voice or that of a local person familiar with it. Someone who has not seen or heard a recorder before is likely to be scared of it, supposing that it will steal his soul or that it contains the voice of his ancestors. Sometimes linguists have even found it necessary to explain the process of writing and the purpose of their note-taking.

For all of his varied enquiries, the field worker needs patient and intelligent informants. Most informants prove to be good at just one or two types of investigation, such as lexicon, or verbal paradigms, or tonal contrasts; few informants are competent for all of the facets of a linguist's researches. The best work is accomplished when the field worker and informant have compatible temperaments.

2. LINGUISTIC SURVEYS[9]

The making of rapid linguistic surveys offers some special problems. Often the informant has had little or no contact with Europeans, let alone linguists. It is necessary to go out of one's way to gain rapport with the informant right at the start of the session. As time is usually limited, it is good to come to the session with the information to be sought fully prepared. Word lists and grammatical material are best presented to the informant in semantic groupings rather than in alphabetical order.[10] Where enquiry is limited to one informant session, a list of about 100 items seems to be an optional amount to ask the average "bush" informant before he shows signs of tiring.

Although recognized standard word lists such as Swadesh's are valuable for several purposes, various considerations may force the adoption of a modified list for surveying a given area.[11] In some areas the likely informants are mostly monolingual, and the only items that can be obtained with fair certainty of their meanings being correct are objects, qualities, and actions that may be clearly demonstrated. For example, "skin", "flesh", and "bone" are not easily distinguished in a monolingual situation unless a cut of meat happens to be available. Often the likely informants have a poor understanding of the trade language that is being used for enquiry, and it is wise to accompany one's enquiries by monolingual-type demonstrations, especially for items that are ambiguous in the trade language. For example, in the Sepik dialect of Neo-Melanesian **smok** may include "smoke of a fire", "cloud", and "tobacco". When clarification of such ambiguities is not easily accomplished by demonstration, such items are best omitted from the list.

If the survey is limited to the languages of a single family, then the grammatical enquiry can be oriented towards the known grammatical characteristics of that family. For example, the Telefol language has obligatorily possessed forms for many kinship words, some of which are suppletive: **fik** 'his elder brother', **tiŋ** 'your elder brother', **baib** 'my elder brother', but no word for 'elder brother'. Telefol also has two sets of pronoun roots, the emphatic and the ordinary, and it has two or more unpredictable stem allomorphs for about half of the verbs. A survey of the languages of the Ok Family, of which Telefol is a member, attempted to enquire into these features whenever there was sufficient time. In some language families a particular word class may have obligatory affixes which are difficult to control semantically through a poorly understood trade language, and it may prove necessary to omit items of this class from the vocabulary list. For instance, in the Ok Family verbs were omitted from the short questionnaire for this reason.

It is good to finalize any necessary modifications of one's survey questionnaire before embarking seriously on the survey, and this pre-

supposes some prior knowledge of one or more languages of the family. If one has no prior knowledge of any of the languages then modifications related to monolingual elicitation and to elicitation through a poorly understood trade language are the only ones that can be made. If two questionnaires are used, a short one of 60 to 100 items for monolingual elicitation in a single 30-minute session and a longer one of 200 or more items requiring a bilingual informant and perhaps two sessions to complete it, then it is advisable for the short questionnaire to constitute the first part of the longer one. In this way the short questionnaire will be completed for every informant, thus giving a uniform set of data for comparison.

When taking data from an informant outside of his own language area it is advisable to hold the session in private. Once, a Kwelmin informant that I was interrogating was very distressed by the Telefomin onlookers who constantly laughed at his strange pronunciation. When using an interpreter whose language is similar to that of the informant it is essential to get the informant to understand that he is to talk his own language and that he is not merely to say what the interpreter says. Despite taking such precautions, in some cases I have detected an increase of up to 20% in the number of words cognate with the interpreter's language due to the suggestive effect the interpreter has on the informant.[12] The same considerations apply when the linguist uses some familiar language of the same family as the medium of elicitation. If the only medium of elicitation is a very similar language of the family, then more reliable results can be obtained by using monolingual elicitation rather than using that language. Similarly, if one has several informants to interview in a particularly short period of time and one wishes to work with several informants simultaneously, then it is advisable to avoid having in the same session informants whose languages are markedly similar in vocabulary, lest they influence each other in their choice of words.

With each set of survey data it is essential to elicit enough general information to put those data in their right setting among the rest of the survey material. To identify the geographical location of each dialect it has been my habit to enquire not only the name of the informant's village, but also that of the main watercourse and dominant mountain of the locality. Around Telefomin it has been customary to move villages and change their names every ten years or so, and consequently some more permanent geographical feature is needed to identify the informant's locality on maps. However, this method must be applied with care in the Ok Family area, since streams have the same name as the mountain at their head, and often two streams on opposite sides of a watershed have the same name.[13] Clan names are usually easier to elicit than elusive dialect and language names. In the Telefomin area there are often dialect differences between clans, and usually there is relative uniformity of dialect within a clan.

However, the same clan name may occur in two different language areas. Each informant has always been asked to evaluate the degree of similarity of the speech of his and surrounding groups. An accumulation of many such judgements from various informants gives a fairly reliable picture of dialect and language boundaries.

3. INVESTIGATING PHONOLOGY[14]

With all informants it has been found best to limit the number of repetitions of an utterance to three or four. Most informants quickly tire of multiple repetitions and get bored with the session; some informants are inclined to lose interest in informant work altogether because of the field worker's apparent dullness of hearing. Furthermore, continued repetitions of an utterance rapidly decrease in linguistic value because of the appearance of tired allophones and intonation patterns, and because in such artificial circumstances the informant's acoustic image of the utterance becomes disassociated from his semantic image of it with a consequent uncontrolled drift in pronunciation that may involve changes of phonemes. It is no longer a meaningful utterance, but a string of nonsense syllables. This phenomenon is one reason why linguists working with informants need to make some positive identification of the meaning of each utterance, rather than rely solely upon sameness or difference of meaning.

When phonological details and contrasts tax the linguist's abilities (which happens more often than most of us care to admit) further repetitions of the crucial utterances can be obtained over a period of time, at several informant sessions. It is wise to put the material being studied into different contexts so that the linguist won't be so biased by his memory of a previous session, and so that the informant won't take these repeated enquiries as an insult to his consistency or correctness in speaking his own language. A tape recorder is able to provide endless repetitions without tiring the informant. Often when working with difficult phonetics, one reaches a point in the session when one's brain tires and refuses to register previously-identified items consistently, or refuses to hear the contrast at all. At this point, or preferably before it is reached, it is expedient to quit. The matter may be returned to later at another informant session.

When eliciting material for a problematic contrast it is best to establish the contrast with sub-minimal pairs of utterances, and especially so in the case of prosodic contrasts.[15] Minimal pairs are excellent for demonstrating the contrast once it has been convincingly established without them. If minimal pairs that the field worker can barely distinguish are used at the beginning of the investigation, then it is essential to be meticulous in specifying or requesting the meaning of every utterance. If the field worker himself uses the

utterance in the vernacular to tell the informant what to say, then it is easy for the informant to misunderstand the field worker's poor pronunciation and to give the opposite utterance from the one the field worker intended. This confusion can be avoided by using synonyms of the minimally contrasting utterances when giving vernacular instructions to the informant, or by using non-linguistic stimuli such as actions or objects, or sketches of actions or objects, in a way pre-arranged with the informant. If the informant is bilingual, instructions for uttering minimal pairs can be given in the second language to avoid confusion. When minimal pairs are difficult for the field worker to hear the informant will often give two or more utterances in close succession - either two the same in an attempt to help the field worker hear it correctly, or two contrasting utterances to help the field worker hear the difference between them. Until the field worker has "tuned in" to the particular contrast he is just as likely to assume that two contrasting utterances were the same or vice versa, unless he takes care always to ask the informant to identify the meaning of each utterance.

A lot of confusion can be avoided in phonemic analysis if a complete phonemicization is made for the speech of just one informant, especially for phonemic systems with several hard-to-hear sounds or systems involving complex inter-related decisions. The speech of other informants, with their variant allophones and allophonic distribution, may then be compared with this and a fuller picture of the phonology of the language be gained. The implication of this for informant work is that all phonological data needs to be clearly labelled with the name and dialect of the informant.

In the case of tonal phenomena some linguists have suggested teaching one's informant to hum or whistle the tonal pattern of each utterance to aid one in hearing these patterns.[16] However, I have found this of limited value. When the field worker finds tone difficult to hear in utterances he resorts to this method because tone is rather easier to hear with humming or whistling. However, the same difficulties in hearing the tonal patterns of utterances which are holding up the field worker's phonemic analysis also prevent him from determining the nature and consistency of the correspondence between these hard-to-hear utterance patterns and the easier-to-hear humming or whistling patterns. Without an understanding of this correspondence, the humming or whistling patterns are of little value for analysis. Their main usefulness is to confirm patterns which the field worker has already tentatively identified in utterances, to clarify his occasional hearing problems, and to identify tonal sandhi and intonation.

For conversational fluency one has to learn to recognize and reproduce all of the phonemic distinctions of the language including those which one finds difficult to hear. Tape recordings, spectro-

grams, tone analysers, humming and whistling, or any other technique only give temporary help in recognizing or demonstrating particular contrasts and features. Ultimately, one has to teach one's self to hear and make such distinctions unaided. Linguistics provides no magic carpet to conversational fluency, but rather a map of the best routes one can walk over a difficult terrain.

4 PAIR TESTING[17]

Pair testing was first formalized by Harris for evaluating an informant's reaction to repetitions of two utterances (A and B) under controlled conditions. If A and B have demonstrably different meanings and are suspected to differ by phonetic features which the linguist has difficulty in hearing, then pair testing indicates whether A and B are homophonous or phonologically contrastive. Harris' method is to present utterances A and B an equal number of times each to the informant, but in random order, asking the informant to identify each item presented to him. For instance, a German linguist wishing to study English [θ] and [š] might present the pair of utterances *thread* and *shred* to his informant. If the informant's identifications match nearly 100% with the linguist's knowledge of the identity of the items as presented, then A and B are deduced to contrast phonologically, whereas if the informant's identifications match approximately 50% with the linguist's knowledge of the items presented, then A and B are deduced to be homophonous.

The items which are presented to the informant for his reaction may be derived in one of several ways.

(a) The utterances may be spoken by a second informant who speaks the same dialect. To ensure that the only communication between the two informants consists of these utterances, it is necessary to arrange the informants so they can't see each other - seated back-to-back on chairs, for instance. So that the linguist may know the identity of the first informant's utterances, he may present some kind of non-verbal stimulus to him. I have had good success with physical representations of the two utterances being compared (both objects and sketches have been used) once the informants have been made familiar with them. To avoid confusion in tabulating the results of a test I prefer to arrange the representations on the floor, one to each side of each informant, so that the linguist may stand in front of the first informant and see both of the representations of A on his own left and both those of B on his right, as shown in figure 1. Alternatively, the linguist may have an assistant standing in front of the second informant to tabulate his reactions. The linguist points to each representation in front of the first informant in slow random succession, and at each pointing the informant says the appropriate utterance. The second

informant points to the appropriate representation to identify each utterance he hears, and the linguist tabulates this response along with his original stimulus to the first informant. Often I run two such tests on a pair of utterances, the roles of the two informants being interchanged in the second test as a check on dialect uniformity. At the beginning the two informants should be taught how to "play" the "game" by using a pair of utterances which are known to contrast.

PLAN OF ARRANGEMENT FOR PAIR TESTING

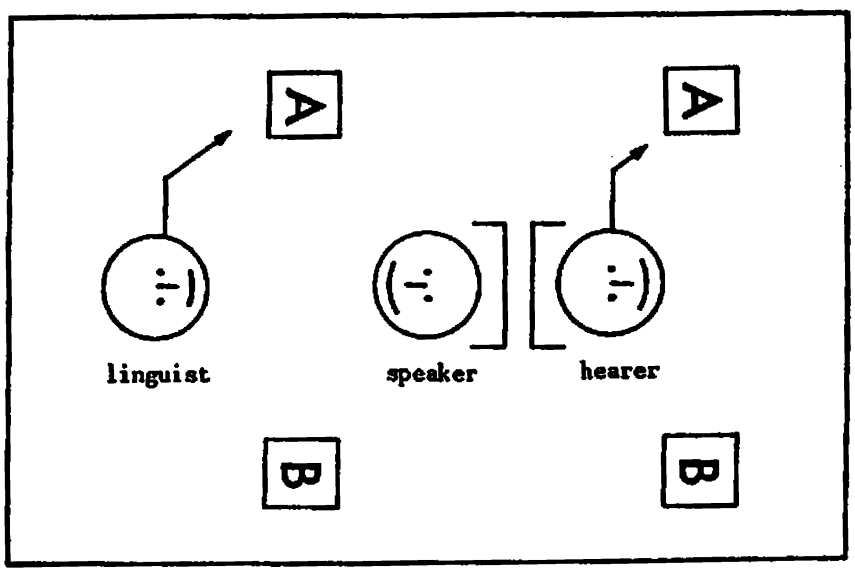

Figure 1.

(b) If a tape recorder is available a rather simpler form of the pair test may be used. The utterances may be pre-recorded by the same informant as is used for hearing-reaction at the end of the test. The linguist may use either verbal or non-verbal stimuli when he is recording provided that only the utterances themselves are actually recorded. Then, with the list of the order in which stimuli were first presented hidden from the informant, the tape is replayed and the informant's reaction is tabulated beside this list and the degree of matching calculated. The informant may react by pointing to physical representations of the utterances or by mentioning agreed synonyms. Provided there are sufficient utterances on the tape not to be memorized, the re-play for hearing can be done immediately after the recording is made. If the linguist has

reason to suspect that the informant was confused at the time the recording was made and that a few of the stimuli were incorrectly interpreted, the tape can be re-played twice and the results of the first and second hearings compared and the degree of matching calculated from them instead.[18]

Determining the phonological status of pairs of utterances with contrastive meanings and with problematic phonetics is the chief usefulness of pair testing in the phonological facet of field work. Pair tests, in the two forms described above, cannot be used for synonymous pairs of utterances, as their meanings or physical meaning substitutes are unable to identify them distinctively.[19]

It is very important that equal numbers of utterances A and B be included when preparing the material for hearing-reaction. If A and B should actually be homophonous, and if the informant should be inclined to give 80% A and 20% B, say, among his responses (and there is no basis for assuming he will give 50-50), the degree of matching between his responses and the original stimuli is only likely to approximate 50% if equal numbers of A and B were originally included in the test design.

It is also important that utterances A and B be presented to the informant for his reaction in random order. On more than one occasion when I have presented material in alternating order the informant thought that an alternating sequence was an essential feature of the test. Later during the session the informant tended to respond to all homophonous examples by alternating responses. This does no harm, but if one doesn't know the actual phonological status of the two utterances under test, then one can't be sure whether an alternating response is merely a formalized response to homophony or an indication that the informant doesn't understand what he is supposed to be doing in the test.

If the informant's reaction to a pair test is that of indecision, how is this to be interpreted? My personal method is to tabulate indecision as "?", but not to count these instances when calculating the degree of matching. However, I assume that a high number of indecisions is as much an indication of homophony as is 50% matching, so long as it is clear from previous tests or practice runs that the informant understands the "game". A high rate of indecision may occasionally be evidence of dialect difference between speaker and hearer. This can be checked by reversing their roles.

If the informant's reaction to a pair test matches the speaker's identifications about 75%, how is this to be interpreted? First, one could use statistics to estimate that the likelihood of such a large deviation as this from 50% occurring by chance is about 0.01 for a 20-item test (my usual size) and about 0.002 for a 40-item test. As this likelihood is significantly small some other explanation is

needed, such as a mixture of homophony and contrast. That is, perhaps one of the utterances involved in the pair test has pronunciation Y and the other has pronunciation Z freely varying with pronunciation Y. If the linguist examines his tabulation of the test results and finds that one of the stimuli has about 100% matching with the reactions and the other stimulus has about 50% matching, then this not only confirms that one of the utterances has free variant pronunciations, but it also indicates which utterance has the free variation should the linguist find this difficult to detect by ear. In Teleéfodl this kind of result occurred when the pair test was applied to problematic sandhi. Testing ateém 'frog sp.' and ateém 'hole in tree' (from at 'tree' and teém 'hole') gave about 70% matching.

Pair testing is only an aid in phonological investigations; it does not do away with the linguist's need for phonetic acuity. The pair test can show that two utterances contrast, but it cannot indicate the nature of the phonetic difference between them. If the field worker can't hear any difference, then listening to other contrasting pairs of utterances may sharpen his hearing in time. Alternatively, a more experienced linguist may be able to listen to his material and suggest the phonetic nature of the difference. If the field worker can hear several phonetic differences between two contrasting utterances, then a pair test cannot indicate which difference is the characteristic or phonemic one. This is determined by careful phonetic observation of which difference is subject to the least free variation and by consideration of symmetry in the process of phonemic analysis. At Telefomin, an early pair test showed a contrast between [bɗl] 'wild banana sp.' and [bɪ̈ˑl] 'valley', but it wasn't till much later that it could be seen that these words contrasted in vowel length and tone pattern, but that vowel quality was not significant, being conditioned by length (and by the author's Australian English vowel bias). The final phonemicizations were /bíl/ and /bíil/ respectively.

5. ELICITING GRAMMAR MONOLINGUALLY[20]

Faced with a monolingual informant, the linguist is cast very much upon his own resourcefulness and his powers of observation. At the beginning he can use pointing and miming extensively, and in fact these devices can be used for years as a method of checking data obtained in other ways. Some linguists make considerable use of pictures, especially series of related pictures that tell some kind of story or that may be described by some kind of grammatical paradigm.[21] I have found pictures fairly satisfactory the few times I have used them with sophisticated informants. However, informants that have had little or no contact with education often fail to recognize the type of line drawings I present to them. In particular, sketches of

natural species tend not to be recognized unless they are exact in much more detail than most of us see, and unless they are life size.

The most vital element of linguistic field work is constant observation, and in a monolingual situation this is doubly true. If each new kind of utterance heard is noted down, further enquiry can be made later concerning its meaning and more examples of its structure can be elicited. Only by being constantly alert to hear what people actually say to each other can the field worker have an early way of checking the accuracy of what people say to him. Some field workers have had the experience of a whole community trying to make language-learning easier for them by talking to them in a trade-pidgin or otherwise simplified version of their language.[22] The sooner such a deception is discovered and corrected the better. It has been suggested that one should deliberately check for this situation in the early days of field work by having a young informant repeat some of his utterances to an old man and watch for the old man's expressions of approval or disapproval or for any changes he might suggest. An old man is likely to be insulted if a young man addresses him in the trade-pidgin.[23]

The elicitation of grammatically relevant data by monolingual means is not easy. In fact, at times it seems to be more efficient to observe than to elicit. That is, it is relatively easy to be always alert for new grammatical features and examples of features that are not fully understood. Starting from such data, the linguist is able to enquire the meaning of utterances containing such features and obtain more examples of their occurrence. On the other hand, monolingual eliciting for the vernacular equivalent of a particular grammatical feature of English can be much more difficult.

If one finds a particular grammatical feature difficult to control while eliciting any kind of paradigm, then one is well advised to use some vernacular free word as a method of control. For instance, Teleéfodl amsín sín floo 'the day before yesterday' was used in eliciting to make sure that verbs were given in the near past tense rather than in any of the other four past tenses. Similarly, either vernacular or trade-language words can be used as controls in bilingual elicitation.

Another technique for investigating the meaning and usage of a function morpheme is that of contrastive elicitation. One asks the informant to compare the meanings of two utterances (either previously observed, or manufactured by the linguist on the spot), one of which contains the function morpheme under investigation and the other differs only by the lack of that morpheme or by its substitution by another similar morpheme of slightly different meaning. Contrastive elicitation can also be used with features of syntactic order.

Exploratory eliciting involves setting as clear a cultural context as possible and then saying to the informant some utterance based on

inadequately understood grammar.[24] Many informants will correlate the context and the linguist's attempt to say something, deduce what he was wanting to say, and tell him how one says such a thing. Utterances elicited in this way need to be compared with several other such utterances elicited in this or other ways to detect any distortions arising from the linguist's "errors" in the stimulus utterance. Also the meaning of such utterances needs to be elicited separately. Whenever exploratory eliciting is used it is best to note down the fact that a particular attempted utterance was considered to be incorrect by the informant, partly as a record of the possible bias of the "correct" utterance given by the informant, and partly as a source of negative clues to grammatical structure.

Situational elicitation involves describing a physical or social situation in some detail and then asking the informant what a particular participant or observer would be likely to say in such a situation.[25] Of course, the linguist's description needs to be true to the culture. Often, utterances obtained in this way will not have the meaning the linguist was attempting to elicit, so need to be checked, both then and later, for their meaning. When using situational elicitation with a bilingual informant I have often found it helpful to precede the description of the situation by a trade-language statement of the utterance I am trying to elicit. The description of the situation, because it is the longer and later element in the elicitation process, tends to remain the main stimulus to the informant. The trade-language statement prefaced to it merely helps to narrow down the informant's choice between the hundreds of different utterances possible in most situations.

Pronouns are best obtained by careful observation. If the language contains several series of pronouns, once the commonest series is known in full this may be used as a basis for eliciting another full series whenever a pronoun of some new series is observed. In this way some 17 series of Telefol pronouns were eventually elicited, even though only a few of the individual pronouns in the later series were ever observed in text. When eliciting pronouns through the trade language, the field worker can assume that the average informant will not actually translate all the pronouns, but will interchange second and first person. The second person can usually be identified with certainty if both the linguist and the informant address their remarks to another person. The person of possessive pronouns can usually be identified with certainty by asking who is the owner of some real thing that belongs to the informant, something that belongs to the linguist, and so on through all the possible persons and numbers.[26]

Questions are the single most useful items in gaining conversational fluency and in eliciting grammatical material from monolingual informants, as well as constituting a major section of the grammar of a language.[27] Often, the features that signal interrogation differ from

one question to the next so that one's knowledge of the syntax of statements does not always permit one to form the corresponding questions by analogy. In a monolingual situation several questions may be obtained quite early in field work by careful observation. Monolingual elicitation is also possible. The presentation of hidden objects or persons and the performing of hidden actions may stimulate the informant to ask "What is it?" "Who is it?" "What are you doing?". Miming a losing-and-searching situation often results in the informant giving "Where is it?", and setting out on some unusual route will prompt people to ask "Where are you going?". "Why" and "when" questions require rather more ingenuity for monolingual elicitation. Once a few questions have been learned other questions may be obtained either by exploratory eliciting or situational eliciting. When one asks a bilingual informant to give the translation in the vernacular of a particular trade-language question, the informant often answers the question instead of translating it. This situation may be avoided by formulating the enquiry so that the informant imagines he is asking the linguist or a third person the question, rather than himself being asked the question.

To ensure that one's data include several examples of each grammatical feature, systematic elicitation of grammatical material is necessary. One way of doing this is to take a text and go through it word by word, and for each new morpheme or construction discovered in it, to elicit several (5 to 20 say) more utterances containing the particular feature. It is good if the informant can see the systematic nature of the elicitation, for his intelligent co-operation can cut the time and frustration involved in early monolingual elicitation to a fraction. When a new feature is discovered it is good to follow it up immediately, while the semantic or grammatical context appropriate to it is still fresh in the informant's mind. Doing so also helps fix the discovery in the field worker's mind for further reference. This means that informant sessions may at times appear rather disorganized by digressions, but in this way the field worker tends to get a more balanced collection of data than if he rigidly follows through his prepared elicitation programme. If the informant can see the field worker's alertness he will do his best work.

Paradigmatic elicitation is commonly used for the systematic investigation of grammatical features. In this method the linguist attempts to elicit a series of utterances which are identical except for one point in their structure where a class of morphemes are interchanged.[28] If picture series or situational eliciting are used the paradigms can be expected to be fairly reliable, but if exploratory eliciting or bilingual eliciting are used there is a considerable likelihood that a few false forms may be given by the informant. The field worker needs to be alert for any hesitancy or facial expression as a clue to false forms. If one asks whether a particular form is

used in the vernacular, some informants will say "Yes" just to please the field worker, even though the purported form be a false one. Even good informants will be somewhat influenced by hearing the utterance from the mouth of the field worker and from time to time will suggest that such an utterance may be used. Some linguists feel that one can never be sure how much the informant has been influenced by the forms used in the process of exploratory or bilingual eliciting, and wish to avoid these methods of eliciting.[29] However, such types of paradigmatic eliciting do speed up the understanding of the rarer features of the grammar which are just as much a part of the language's system as are those which occur more frequently. Most of the biased responses can be detected as inconsistencies if the field worker elicits the same material on several different occasions and in several different settings. These false forms can be eliminated, and perhaps be replaced, as the result of further checking. For instance, enquiry into their meaning or usage is often met by a denial of their real existence on the part of the informant.

The main emphasis here has been upon methods of investigating grammar with monolingual informants because these methods are applicable far beyond the bounds of monolingual situations. Many a linguist working with a bilingual informant finds, at some point in his grammatical enquiries, that either he or the informant has an inadequate grasp of the trade-language for such detailed investigations. At this point monolingual methods have to be resorted to.

6. DETERMINING MEANING

Perhaps the commonest weakness in bilingual translation elicitation of the "How do you say" type is that, because of the informant's or field worker's inadequate knowledge of the trade language, the informant's vernacular utterance is not an accurate translation of the English utterance that the field worker had in mind when he began eliciting. The best remedy is always to ask the informant to translate his vernacular utterance back into the trade-language. This trade-language form is written down as the "meaning" of the vernacular rather than the original English utterance the field worker started with. As the field worker gains a better understanding of his informant's idiolect of the trade-language he is in a better position to translate such "meanings" into English. Thus back-translation is used not merely as a checking device, but as the primary technique for determining meaning.[30]

Several observations or occurrences of a grammatical feature are of more value than a single observation or occurrence. Usually a single occurrence of an item provides only very ambiguous information about the meaning or grammatical behaviour of that item. To ascertain the meaning of a stem often requires 10 or 20 occurrences of it and a good

deal of informant explanation of the cultural contexts of its usage. To ascertain the meaning of a function morpheme often requires 50 or 100 occurrences of it and considerable investigation into which grammatical features co-occur with it.[31] One should expect that some of the function morphemes of a vernacular will have no translation equivalent in English, and that some will have several disparate translation equivalents. When working with a bilingual informant one needs to be patient when he is unable to explain the meaning or usage of a function morpheme, recognizing that in these circumstances the need is for a large number of examples of the morpheme in a wide range of occurrences, and that it is the linguist's analysis of these that will provide a basis for guessing at the meaning and making further enquiry.

When noting questions that have been observed it is important to note also their replies if possible. Once the paradigmatic variations of a question are understood by the linguist he is then in a position to use this type of question often in conversation and to note down the responses. Also, he may ask his informant to give him several typical replies to each question. The meanings of the replies to a question provide the clearest picture of the meaning of the question which stimulated them.

It is good to note down each new word that is heard, even when there is no indication of its meaning. It is far easier to elicit examples and the meaning of a word that has been observed than to elicit the word for a particular meaning that interests the linguist. When enquiring about the area of meaning of a word or checking on its collocations, it has been found of only limited usefulness to ask whether or not that word can be used in a given situation, since every now and then the informant will say "Yes" when he should have said "No" - either to please the linguist or to hasten the end of a session that involves too much hard thinking for him. It seems preferable to ask the informant in what situations the particular word can be used and to request illustrations.

When investigating the meanings of a set of near synonyms I have found the following procedure useful. Taking each word in turn, enquiry is made as to the situations in which it is used. Next, a composite list is made of all the situations mentioned for all the words in the set. Then, for each situation in turn, the informant is asked which words of the set can be used in that particular situation. If more than one word can be used in the same situation, then enquiry is made as to whether their meanings are the same or different in that situation.

When testing for collocations it is good to get several typical utterances on several occasions to ensure a good spread of meaning variants and usage. For each verb it is necessary to enquire as to

its typical subjects, typical objects (if transitive), its typical beneficiaries or indirect objects, and any other clause-level category that is closely related to the verb stem. For example, for Teleéfoól it was necessary to enquire for each verb whether it took all persons as subject, or only plural persons, or only the third person feminine singular (sometimes with an impersonal meaning). When each new grammatical feature is discovered, it is economical to examine first just a sample of the appropriate word class (50 verbs, say) to see how this feature applies to them. If it is seen to be systematic and predictable in some way, then no further research is needed. But if there is evidence to the contrary, then all the words of that class in the lexicon will need to be examined for this feature, as well as each new word discovered. For instance, only a couple of months before the conclusion of field work at Telefomin a sample of verbs were being examined for their tonal patterns in all paradigmatic forms. It was noticed that the punctiliar benefactive forms seemed to have unpredictable tonal patterns, and some 400 verbs were examined and the existence of tonal classes among the verbs was confirmed.

7. USING TAPE RECORDERS[32]

The field worker needs to be thoroughly familiar with the operation of his tape recorder, to be able to make minor repairs and lubricate it on the field, to carry a small supply of fuses and commonly needed spare parts, and to carry an adequate supply of batteries if the recorder is battery operated. He needs to know what volume control settings to use under various conditions in case the level indicator should go out of action. He should have or devise some way of telling when the batteries are flat and need replacing, and when the tape is slowing down appreciably. He needs to practise threading the tape past the heads so that it always records without fail. The level indicator only shows that the voice is passing from the microphone to the recording head; the voice may not be reaching the tape if it has been incorrectly threaded onto the machine. The only sure way is to listen to the playback, or to record a few seconds and then play that back, whenever one changes tapes or sides of tapes on the machine. It is good to have some idea of the directional properties of the microphone - how much softer does the same noise sound on the tape when it is made beside or behind the microphone (at the same distance) rather than in front of it? Early in field work one needs to listen critically to the first few recordings to assess the common types and levels of noise - pigs, dogs, roosters, children, walking in the house, shuffling papers, coughing, rain on a metal roof, blowflies, cicadas, night insects - so as to decide what place, time, and circumstances are the most practicable ones for recording.

Magnetic tape is relatively cheap compared with the price of a recorder. It is vital that the field worker have an adequate supply

of tape, and that towards the end of his stay in the field when he has a better grasp of the language and the problems to be solved, he be generous in its use. There are many situations where tape recording is vital - the informant is available for only a short time, or he is the last speaker of an otherwise extinct language, or for one reason or another he will not repeat any utterance - so vital that it is advisable to have a tape recorder running without stop right through the informant session.[33] This provides much more information than one's written record usually contains. Also, this is much more economical of time than the method of just recording the more important items of data. For instance, in survey work I have found that to alternate between writing and recording wordlists takes about 50% more time than does simultaneous writing and recording. The linguist should take several empty tape reels to the field, and use a new one each time he wishes to interrupt his work on one tape to use another tape. Eventually, this saves a lot of time that would otherwise be spent in rewinding the tape and finding the right place again.

Tape recording can assist the linguist in his language learning and in attaining his goal of conversational fluency. He may record phonetic drills and use them to improve his pronunciation, especially for stress, length, tone, rhythm, and intonation. In the absence of conversational opportunities, listening to texts over and over again on tape helps improve one's recognition of intonation patterns, function morphemes, and common word combinations. Drills of both words and complete sentences may be used for mimicry once one has a fair grasp of the phonetics involved and the attaining of normal speaking speed is the main problem. Occasionally one should record one's own voice alongside that of one's informant, using the same utterance. Listening to such recordings is a kind of shock therapy, spurring one on to more frequent and careful mimicry.[34]

Whenever phonological contrasts (especially prosody) present a hearing difficulty liberal use can be made of a tape recorder to take down all the data that seem to be crucial to the phonemic analysis. Such tapes can be used for multiple playback (without tiring as does an informant), can be stored for checking later when the field worker's hearing has sharpened by practice, or can be submitted to a more experienced linguist for his evaluation.

Some situations require the recording of short portions of speech at close intervals, as in preparing language-learning drills or pair tests. This requires good control of the stop-start mechanism of the tape recorder. It also requires a considerable degree of cooperation from the informant so that he will say exactly what is needed when it is needed. A method I found useful at Telefomin was to indicate to the informant in the trade-language the utterance that I wanted and then wait until he said it. When he said the vernacular I wanted, I would switch on the recorder, say something in English to identify or

translate the item, pause, then signal the informant who would say the vernacular utterance into the microphone. If the informant doesn't say the desired utterance, I re-elicit till he does. It is essential to have the informant actually say the desired utterance before beginning the recording, otherwise he is likely to hesitate at the crucial moment in the recording or say something else that is not wanted. In either case one may feel this has spoilt the recording and take time to erase it, and in the process perhaps offend the informant.

It is a popular pastime to record many hours of text material on magnetic tape, and to bring it back from the field for transcription and analysis at home.[35] Unless the linguist knows the language well this is a waste of time and tape. To transcribe tape without an informant requires the ability to recognize immediately the elisions and contractions that occur in speech at normal speed, and the ability to weigh up the various lexical and syntactic possibilities so as to reconstruct the occasional word obscured by noise on the tape. Many of us don't know the language we are studying that well, and need to bring home more than a text on tape. It is essential to transcribe the tape onto paper while still in the field.[36] It is best to do this as soon as possible after recording, using as informant someone who was present when the recording was made, if possible the person whose voice was recorded. I have found it most satisfactory not to transcribe directly from the tape, but to use the tape as an informant prompting device, and to transcribe from the informant after he has heard the tape and repeated it, a few seconds at a time (in pause groups where possible).[37] Some informants are good at this tiring work, but others are quite unsatisfactory because they give the meaning of what they hear from the tape in different words rather than an exact repetition. Even a good informant will sometimes say something different from what the linguist feels he can hear on the tape. It is best not to argue with the informant, but to transcribe both versions. Usually the difference is that between slow and fast forms. For instance, my Teleéfodl informant always insisted on the slow form **kanubeé** 'if' where I often heard **nubeé** on the tape.

Towards the end of my field work I found that every hour of continuous speech on tape took me about 70 hours (3 hours per day was about all the informant and author could tolerate) to transcribe phonemically, to ascertain the meaning of all unfamiliar morphemes and grammatical features, and to obtain a fairly accurate free translation. Recordings that are too soft, or have too much noise, or are of speakers who are excessively fast, take about twice as long to transcribe and usually aren't worth that much field time.

Once stories have been recorded, the field worker's tape recorder is likely to become a source of community entertainment. He will often be pressed to replay various of his tapes by way of payment for story telling. Whenever I record text I have found it satisfactory to

play back just the last few minutes of the text. This is still some kind of reward for the person giving the text, without being boring or time-consuming, and at the same time serves as a check that the recording is technically satisfactory.

Because of community interest in one's recordings and because playing back is likely to be a public affair at any time (unless one uses headphones), it is wise to check the meaning of what has been recorded as soon as possible, either with the person who gave the text or with a trusted informant. If any of the content is offensive in any way, or involves taboo topics, then this tape must be clearly marked that it is not for public replaying. I prefer to erase such material completely so as to avoid any danger of embarrassment or marring of my relationship with the informant or his community. One way to avoid recording such material is to make recordings under circumstances that could be regarded as public in some way. If both sexes are within earshot at the time, taboo topics are not likely to be recorded, and if several people are within earshot insults are not likely to be used without the linguist knowing. Although taboo topics are of interest to anthropologists and may even be of linguistic interest too, the difficulty of finding adequate privacy for replaying and transcribing it on the field is considerable, as is the danger of accidentally having the replay volume too loud, and it seems wise to obtain such texts without a tape recorder. I know of a field worker who replayed a tape for entertainment, without realizing that it contained material highly insulting to one of the audience. In a flash, the man was brandishing a bush-knife and chasing the informant and his relatives.

Sometimes it is difficult to get text material. Informants who seem uninterested in telling stories may be encouraged to give an account of some very recent event in which they participated. Some field workers encourage reluctant informants to tell a story in the trade-language and then ask them to say the same thing in the vernacular.[38] However, it has been my experience that the vernacular version, being a repetition, is usually much shorter and less interesting than the trade-language version. Of course, even short texts are better than no texts. Accounts of crafts, customs, warfare, and biographies are other types of topics for text collection. Personally I have avoided folklore and similar traditional accounts because they are likely to contain archaic language forms rather than the language spoken today. It also happens that much of the folklore at Telefomin is the property of the initiated men, and it has not been recorded to avoid accidentally breaking taboos by playing back within earshot of women or children. Another device for getting text material is to replay a story or account previously recorded, and then ask the informant to tell the same story again in his own words. This may be done several times over for the one story, either with different informants

or with the one informant over a period of months, thereby providing a set of similar texts all describing the same physical or social situation. These are a potential source of paradigmatic material and for material involving grammatical transformations.[39] Another way to get text material when few informants get the idea, is to get a group of people together when they are relaxed and in a talkative mood (after the evening meal, say). If one person can be induced to tell even a short story, the other members of the group are soon eager to have their turn to record a story and hear the replay. Another way is for the linguist to attempt to tell some short story, and sometimes stories will come tumbling out in response. Some linguists first elicit a considerable amount of vocabulary in a given semantic domain, and then immediately request text material. This vocabulary stimulates reluctant informants to give stories or ethnographic accounts, and also prepares the linguist for transcribing the text.[40]

Conversations recorded on tape are prize material for the grammarian, but natural conversations are difficult to record. Those staged in front of a microphone are stiff, but may become more natural as the participants become more interested in their topic (key: suggest a "hot" topic), especially if the field worker can forget his tape recorder (or the direction of the microphone or the level indicator) and take a genuine but non-vocal interest in the conversation. Another way of obtaining records of natural conversation is to leave the recorder all set up in a suitable semi-public place, and as soon as one hears a conversation in progress switch it on without the participants knowing. Alternatively, two or three people could be ushered into a room where the recorder is usually used, with the recorder previously switched on in case a conversation should begin. It may be advantageous to cover the microphone with cloth to make it less obvious and to cover the top of the recorder so the moving reels can't be seen. I record only conversations of a non-personal nature, conversations held in some kind of public situation. It is good to play back the tape immediately to the participants for their approval, or if that is not possible, to a trusted informant, to make sure that no one will be offended by the keeping or studying of the recording.[41] Linguists have differing views as to the value of a single informant recording imaginary conversations.[42] Conversations between two people are the best; the more people participating the more likely it is that several people will talk at once, and this is almost impossible to transcribe from the tape.

In conclusion, one can but reiterate what others have said: "Proper field procedure is absolutely essential to any adequate analysis or description of a language, but frequently it is the most neglected aspect of the linguist's training. ... He should have some understanding of the various approaches to collecting data, of the most successful ways of handling informants, and of the methods by which the field procedure may most advantageously supplement the analytical processes."[43]

NOTES

1. Pre-literate peoples that have had little or no contact with Western education or ways of life are here called "unsophisticated", rather than the less ambiguous but more coloured "primitive".

2. This study was supported by a scholarship from The Australian National University. For the sake of literary style much of the presentation is in the third person or impersonal. These Telefodl experiences are occasionally supplemented by the author's experiences with unsophisticated informants elsewhere in New Guinea and the Philippines gained under the auspices of the Summer Institute of Linguistics, and by the experiences of other linguists and anthropologists, clearly indicated as such.

3. The best general guide to informant techniques is Nida 1949: 175-191. Discussions of the general approach to informants are also found in: Bloomfield 1942, Capell 1940: 67-72, Collinder 1963, Cowan *et al.* 1958, Cummings 1916, Elson and Pickett 1962: 147-151, Gleason 1961: 287-290, Henry 1940, Hilger 1954, Keesing 1957: 23-34, Mead 1939, Nida 1947, 1950, Paul 1953, Royal Anthropological Institute 1951: 29-46, 208-218, Ward 1937, Wolfe 1959: 18-24.

4. See also Pike 1947: 231, Cowan *et al.* 1958. "Field worker" and "linguist" are here used interchangeably for "linguistic field worker".

5. Occasionally the field worker and informant may rely on an intermediate language other than a trade language, such as another vernacular or the language of the field worker.

6. This suggestion came from several colleagues of the Summer Institute of Linguistics.

7. This suggestion comes from Royal Anthropological Institute 1951: 44-45 and from M.A. Jaspan in private communication. See also Keesing 1957: 34.

8. This experience was mentioned by S.A. Wurm in private communication.

9. See also Swadesh 1954.

10. Collinder 1963 also warns against alphabetical word lists. One must not be deceived by the publication of word lists in alphabetical order for easy reference. For example, Swadesh 1954 gives his 200 words alphabetically but mentions the need to elicit the words in semantic groupings.

11. Pop 1955 shows the variety of linguistic questionnaires that

linguists, and especially dialect geographers, have used down through the years. See for instance his p.19 (Balbi 1826), p.49 (Grierson 1894), and pp.98, 133 (Cohen 1928, 1951). Questionnaires not mentioned by Pop include: Bee and Pence 1962, Capell 1945, 1952, Dixon and Kroeber 1919: 49, Drabbe 1959: 161-184 (and other works), Gibbs 1863, Hymes 1960: 4-12 (discusses word list design), Kirschbaum und Fürer-Haimendorf 1934, Kirschbaum 1935, Ray 1907: 391, 483 (and other works), Rowe 1954, Short Guide 1933, Strong 1917 (and other years), Swadesh 1950, 1954, 1955, Tri-Institutional Pacific Program 1952.

12. Professor Collinder of Uppsala tells me he has had similar experiences.

13. This practice has also been noted by Brongersma and Venema 1962: 114, 143.

14. See also Gleason 1961: 286-311, Nida 1950: 86-87, 133-139.

15. Pike 1947: 105 also discourages relying on minimal pairs when analysing pitch, but for a different reason - their relative infrequency in the lexis.

16. Gleason 1961: 301, Pike 1948: 44.

17. Harris 1951: 32-41. See also Chomsky 1955, 1961: fn. 15, 1962: 96-99, Halle 1954: 200, Hockett 1955: 146.

18. To make a detailed study of the free variant ranges of two contrasting phonemes it would be possible to replay such a tape twenty times, say, and to identify allophones in utterances heard most consistently as typical ones, and those in utterances heard least consistently as allophones at the fringe of the range of free variation. This suggestion is equivalent to the form of the pair test given by Halle 1954: 200.

19. However, another form of the test mentioned by Chomsky 1962: 96 does not depend on the positive identification of each utterance spoken and heard. Utterances are produced two at a time, and each time both the speaker and hearer are requested to indicate independently whether the paired utterances are "same" or "different". If tape recording is used the speaker and the hearer are the same person, and the two sets of judgments are made at different times. These are compared, and again, about 100% matching is interpreted as phonemic contrast and about 50% matching as homophony. An equal number of actual sames and differents need to be produced. This form of the test could conceivably (despite elicitation difficulties) be applied to synonyms, and 100% matching would correspond to allomorphic (free) alternation, and provided that both speaker and hearer are demonstrably evaluating sounds rather than meaning, 50% matching would correspond to complete allomorphic identity. However, if the informant evaluates

meaning rather than sound, it is to be expected that he will always respond "same" and the test is incapable of distinguishing allomorphic alternation and identity.

20. See also Cowan *et al.* 1958, Cummings 1916: 32, Elson and Pickett 1962: 150, Henry 1940: 641, Loving 1961, McLeod 1961, Nida 1949: 175-178, Pike 1947: 231, Royal Geographical Society, 1944: 357-359.

21. Collinder 1963, Harris and Voegelin 1953, Hayes 1954, Voegelin and Robinett 1954.

22. Personal communications from W.M. Rule and C.I. Frantz.

23. Suggested by S.A. Wurm in private communication.

24. See also Cowan *et al.* 1958, Harris and Voegelin 1953: 75, Henry 1940: 641, Loving 1961.

25. There is an extensive discussion of "situational testing" in Wurm 1959.

26. Nida 1949: 177 suggests joint miming with an informant to elicit pronouns (see also pp. 180-1); Capell 1940: 68 suggests using a previously documented neighbouring vernacular to elicit pronouns with an informant bilingual in that vernacular (I have had good results with this method), and Wurm 1959 has further suggestions.

27. The value of questions has been emphasized by Cummings 1916: 31, Henry 1940: 640, Mead 1939, Ward 1937: 29-30. The monolingual elicitation of questions is discussed by Cummings 1916: 32, Elson and Pickett 1962: 151, Loving 1961, McLeod 1961, Nida 1949: 176-177.

28. Material for systematic elicitation of grammatical features is found in Cummings 1916, Capell 1945, 1952, Elson and Pickett 1962, Kirschbaum und Fürer-Haimendorf 1934: 42-54, Nida 1947, 1949: 178-185, 1950: 56-77, Wurm 1959.

29. Bloomfield, for example, as mentioned in Harris and Voegelin 1953: 61-62. Many writers regard paradigmatic elicitation, especially using bilingual methods, as a necessary evil, and urge that great care be taken to check the results: Harris and Voegelin 1953: 62, 68, McLeod 1961, Nida 1949: 186, Wurm 1959. Voegelin and Voegelin 1957: 3-4 claim that as a result of cross-checking, bilingual elicitation eventually yields reliable results.

30. Henry 1940: 637 lays similar stress on back-translation. Phillips 1960: 189 mentions that it is easier for a person to translate from his second language into his first language rather than vice versa. If accuracy of translation also follows this pattern, then the only circumstances which would justify using back-translation as the

primary source of meaning seem to be (a) if the field worker is less competent in the trade language than the informant (it is difficult for the field worker to make an impartial assessment of this), (b) or if the field worker and informant speak considerably different idiolects/dialects of the trade language and the informant has much more trouble than the field worker in translating between the two.

31. The semantic analysis of function morphemes is well illustrated by Garvin 1958.

32. See also Carroll 1953: 60-61, Gleason 1961: 309-311, Harris and Voegelin 1953: 70, Hayes 1954, Lounsbury 1953, Rowe 1953: 914-917, Swadesh 1954, Voegelin and Robinett 1954, Voegelin 1950.

33. Continuous recording is also recommended by Lounsbury 1953: 410.

34. Further ideas on the use of tape recorders for language learning may be gleaned from Oinas 1960.

35. Boas 1917 and Bloomfield 1942: 4, 14 have discussed the difficulty of training informants to dictate texts slowly, the inevitable syntactic distortion in dictated texts, and the near impossibility of obtaining natural conversational texts. The advent of good, cheap, portable tape recorders has greatly reduced these problems.

36. Transcription of tapes whilst still in the field has also been emphasized by: Collinder 1963, Harris and Voegelin 1953: 70, Voegelin 1950, Voegelin and Robinett 1954.

37. Lounsbury 1953: 410 also mentions the tape recorder's informant-prompting function.

38. This suggestion comes from Henry 1940: 639.

39. The value of multiple accounts of the same incident for paradigmatic material is suggested by Pittman 1957.

40. This suggestion comes from Voegelin and Robinett 1954: 99.

41. Like Barnes 1963, I do not approve of completely secret recordings.

42. R.S. Pittman mentions (private communication) having good results with this method, whereas Harris and Voegelin 1953: 63 are quite pessimistic.

43. Nida 1949: 175.

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A SURVEY OF THE OK FAMILY OF LANGUAGES

Alan Healey

0. INTRODUCTION

The languages of the Ok Family are spoken in adjacent parts of Irian Barat, the Trust Territory of New Guinea, and the Territory of Papua, as may be seen from the attached map. These languages may be divided into two sub-families on purely linguistic grounds, but this division also correlates well with topographical features. The Mountain-Ok Sub-Family includes at least six languages, and perhaps ten. These are spoken by a total of some 30,000 people, most of whom live at an altitude of from 2,000 to 6,000 feet in the valleys of the Star Mountains and the mountains to the east. The Lowland-Ok Sub-Family includes at least three languages, and perhaps five. These are spoken by a total of almost 20,000 people, most of whom live in the swampy and low hilly country between the Kao River and the Tedi (Alice) and Fly Rivers.

Each Sub-Family may be further broken down into Divisions as follows:

Mountain-Ok Sub-Family (MO)

Division A (MOA): Telefól, Tifal, Kauwol, Faiwol, Setaman, Bimin, Trans-Strickland

Division B (MOB): Mianmin, Wagarabai

Division C (MOC): Ngalum, Sibil

Lowland-Ok Sub-Family (LO)

Division A (LOA): Southern Kati, Northern Kati, Yonggom, Iwoer
Division B (LOB): Ninggirum, Upper Tedi

The position of Ngalum and Sibil within the Ok Family is uncertain because of inadequate information concerning them. They may well constitute a third Sub-Family of Ok rather than a Division of Mountain-Ok. If such were the case a different classification of the languages would be appropriate:

Eastern-Ok

Division A (= MOA above)

Division B (= MOB above)

Western-Ok (= MOC above)

Southern-Ok

Division A (= LOA above)

Division B (= LOB above)

The first of these two classifications has been tentatively adopted throughout this survey.

The following is a list of the language name abbreviations used in this work:

BK Bimin, Kuskusmin clan

BM Bimin, Bimin clan

DK Kaeti (Dumut)

DW Wambon (Dumut)

FA Angkiakmin (Faiwol)

FF Faiwolmin (Faiwol)

FG Gipman (Faiwol)

FI Imdalmin (Faiwol)

FS Setaman ("Faiwol")

FW Wokfiakmin (Faiwol)

GL Mt. Goliath Pygmies

KA Northern Kati by Brett and Brown from informant Ayem

KD Digoel(eesch) (Southern Kati)

KM Metomka (Southern Kati)

KN Ninatie (Northern Kati)

KW Kauwol

LO Lowland-Ok Sub-Family

LOA Lowland-Ok Division A

LOB Lowland-Ok Division B

MN Mianmin

MO Mountain-Ok Sub-Family

MOA Mountain-Ok Division A

MOB Mountain-Ok Division B

MOC Mountain-Ok Division C

NK Kativa (Ninggirum)

NN Ninggirum (Ninggirum)

NS Sibil (Ngalum)

OB Oksapmin from informant Bitel

PLO Proto-Lowland-Ok

PMO Proto-Mountain-Ok

PO Proto-Ok

TA Atbalmin (Tifal)

TF Tifalmin (Tifal)

TL Teléfól

TW Wopkeimin (Tifal)

UT Upper Tedi

WG Wagarabai

YM Yonggom

1. THE LANGUAGES OF THE OK FAMILY

Each of the languages listed in the tentative classification presented above is now discussed from the non-linguistic point of view. Alternate language names, geographical distribution, and

population estimates are given, fragmentation into dialects is mentioned where information is available, and the quantity and quality of data available are discussed.

1.1 MOUNTAIN-OK, DIVISION A

TELÉFÓL is the name given to the language spoken by the Teléfólmiín group of people living around Telefomin in the Australian Territory of New Guinea, as well as in the Elip (Ilib) and upper Niar (Níná) valleys to the north. A second dialect of Teléfól is spoken by the Feramin (Fálamiín) on the headwaters of the Sepik to the south. The 1960-61 census showed 2797 counted plus 500 estimated Teléfólmiín and 835 Fálamiín. The author has a word list of 100 items plus 1 hour's tape recorded narrative in the Fálamiín dialect. However, his main work during the past five years has been in the Teléfólmiín dialect. This has involved the completion of the phonological and morphological analyses. The author's wife has been chiefly responsible for the syntactic analysis and the compilation of a 5000-word dictionary. In 1957 Rev. G.J. McArthur of the Australian Baptist Missionary Society made a tentative phonemic analysis of Teléfól and published 200 pages (duplicated) of Bible stories and doctrinal materials.

TIFAL is the name of the language spoken by the Tifalmin people in the valley of the Ilam River west of Telefomin, and Steinkraus has given this language name to all of the groups of people speaking dialects of this language. These include the various groups called Atbalmin by their neighbours to the east -- the Unankalinmin, Busilmin, Amtanmin, Arimin, and many other clans living in the valleys of the Din (or Bruchen) and Iugum (or Casuarina) Rivers and the Atemkismin clan living in the Dagiam (Dagayum?) River valley, all of these streams being tributaries on the southern side of the Sepik River in the Australian Territory of New Guinea.[1] The Tifal language is also spoken by the Wopkeimin, Opkemin, or Optimin group living at the headwaters of the Ok Tedi in Papua. The difficulty that the author has experienced in getting a word list from Wopkeimin that is not biased towards the language of interpretation (Faiwol) suggests that many of these people (and especially those living around Bultembip) may be bilingual in Tifal and in Faiwol. Tifal is also spoken by the Urapmin clan living on the western banks of the Sepik close to Telefomin, many of whom speak Teléfól as a second language. The best of the word lists still give evidence of Wopkeimin being a distinct dialect of Tifal, the most marked difference being the occurrence of phonological features (e.g. initial /g/ and medial /ai/ diphthong) similar to Faiwol. Atbalmin and Tifalmin-Urapmin seem to be two other dialect groups, with the main difference between them being in vocabulary. So far as population is concerned, the Wopkeimin have been estimated as between 150 and 500, the Tifalmin-Urapmin have been counted as 829 (1960-61 census), and the Atbalmin have been estimated at under 2000 by

officers of the Australian administration.[2] The Tifalmin dialect of Tifal has been studied for more than two years by Steinkraus of the Summer Institute of Linguistics, who has kindly made available his two unpublished papers on the phonology plus a list of some 600 words. Six pages of Bible stories have been published. The most reliable material for the Wopkeimin is a list of 100 words collected by Steinkraus. Many short word lists have been collected for Atbalmin, including lists by Steinkraus and Patrol Officer J. Tierney, the longest containing 160 items.

KAUWOL is the name tentatively given to the language of the people inhabiting the upper Kauwol valley on both sides of the Indonesian-Papuan border. This includes the people on the Fatik River, the Benkwin people, the Bumdit people, and probably the Ablemkilmin. The latter group may exhibit bilingualism, with Tifal as a second language. In Papua, this population has been estimated as around 270, so the population as far west as the Ok Denom may total 500.[3] The best information on this language is the author's list of 60 words.

FAIWOL seems to be about the best name for the language spoken on the headwaters of the Fly River (Wok Feneng or Wok Bilak) and the Palmer River (Wok Luap). Actually, within the language area this name is applied only to clans living on western tributaries of the upper Fly, but in the lowland country to the south this name is applied to all mountain dwellers, including those to the east and the west of the Faiwol language area. In some localities the pronunciation "Faiwoimin" is heard and at Telefomin the pronunciation "Fegolmin" is used. The clans speaking Faiwol include: Imdalmin (Imdelmin) in the Arip River valley, Atemkiakmin and Ninglinmin in the Fly valley, Angkiakmin (Unkia, Engkiakmin) in the Bol River valley and the headwaters of the Wonggop (Oggop) River, Yagamkiakmin on the southern slopes of the Emuk and Kaban ranges, and the Gipman, Wokfiakmin, and Figalin(min) as one goes down the Palmer River. From a consideration of informants' reports on the size of the various clans the author is prepared to suggest that the population of the Faiwol language group may be as large as 3000. There seem to be several dialect variations, with the Imdalmin speaking a western dialect (they would also seem to speak Tifal as a second language), the Atemkiakmin, Ninglinmin, Angkiakmin and Wokfiakmin speaking a central dialect, and the Gipman speaking a southern dialect. For Imdalmin there is a short list of 50 words by Steinkraus, for Wokfiakmin a list of 60 words by Assistant District Officer F. Esdaile, for the Faiwolmin (Atemkiakmin?) lists of 100 words by both Steinkraus and the author, for Gipman 170 words by the author, and for Angkiakmin 600 words plus grammatical notes by the author.

SETAMAN (Seltamanmin) is a small group on the headwaters of the Palmer River that appears to speak a language distinct from both Faiwol and Bimin. However, the only information available is a list

of 60 words by Assistant District Officer F. Esdaile, and more research is necessary to confirm the status of Setaman as a separate language.

BIMIN is the name tentatively applied to the language of the people living in the valley of the Wonggop River (Oggop) that flows into the Strickland just above the Devil's Race. They include the following clans: Bimin, Kuskusmin, Kwelmin, Onkarinmin, Kasanmin, and perhaps Korra. As very little patrolling has been done in this valley it is only possible to guess at a population of 1000 speaking this language. There is a 75-word list of Kuskusmin from Patrol Officer J. Hicks, and 50 words by Rev. K. Bricknell, and the author has taken 550 words and a little grammar from an informant of the Bimin clan. Although this Bimin informant is a third generation descendant of a group of Oksapmin migrants into the Bimin area, his speech seems to show no greater similarity to Oksapmin than does Kuskusmin.[4]

TRANS-STRICKLAND represents a group of four clans on the eastern bank of the Strickland that are known as Faiwol and are presumed to speak a language of the Ok Family.[5]

1.2 MOUNTAIN-OK SUB-FAMILY, DIVISION B

MIANMIN are estimated at 1500 by Australian Administration officers, the people and language being known by the same name. They live in the northern part of the Fak (Hak) River valley, the Aki River valley and neighbouring tributaries at the headwaters of the August River, on the tributaries of the Upper May River, and perhaps on the Right May River. The author has 600 words and grammatical notes on the Mianmin language. There seem to be some slight dialectal variations between the many small clans.

WAGARABAI is a tentative name for the language spoken by the people living on the Wagarabai River, a tributary of the August River. Their speech is very similar to Mianmin, but different enough from it to warrant treating it as a separate language for the present. The 7 villages so far mapped in this area may well represent a population of 500. The people of the Right May River may speak Wagarabai rather than Mianmin. The people of the West Range further to the north are still completely unknown linguistically. The only Wagarabai data available consist of 60 words taken at Suganga by Patrol Officer N.J. Cavanagh and 180 words and sentences taken by J. Bass of the Summer Institute of Linguistics. The informant for the latter list was a 10-year old boy found by an Administration patrol at Imnai on the August River. According to the Administration interpreter at Green River, this informant originally came from the August headwaters, but according to mission lads with whom he now lives, he originally came from Birimei on the upper Idam River.[6] If this latter should be true, then this is evidence for Wagarabai being spoken along the West Range.

1.3 MOUNTAIN-OK SUB-FAMILY, DIVISION C

NGALUM is spoken by the Ngalum people in and around the valley of the Nangul River (Ok Nangul) in Irian Barat, the valley also being called Kiwirok.[7] The population speaking this language extends from the Australian-Indonesian border to the valley of the Ok Bi to the west, and from the upper Sobger River in the north to the valleys of the Ok Bon and the Ok Sibil in the south.[8] The Kupel people living in the Ok Bi valley (or the upper Sobger valley or the Samur valley?) seem to speak a dialect of Ngalum, and the people living south of the central range show dialect differences from the Ngalum people.[9] As no comparable linguistic samples are available from these three groups (Ngalum, Kupel, Sibil), it is not possible to say whether these "dialects" are consistent with the standards applied throughout the rest of this listing. A recent estimate puts the Ngalum group at 15,000, and the comments made by Reynders suggest a polulation of at least 3,000 speaking the Sibil dialect south of the central range.[10] Dr. Anceaux has some information on Ngalum, but the main work on this language has been done by members of the Unevangelized Fields Mission.

SIBIL, though apparently a dialect of Ngalum, is entered separately because it is the only dialect of Ngalum in which any linguistic information has been published. This dialect is spoken in the valleys of the Ok Sibil and Ok Tsop, and perhaps the Ok Bon. As mentioned above, the population is probably at least 3,000. Considerable study of this dialect has been made by U.F.M. missionaries and by Dr. Anceaux. The only data available to the author at the time of writing are a total of 80 miscellaneous words from three different sources, and a few general features mentioned to the author by Dr. Anceaux.[11] The only evidence that Ngalum and Sibil belong to Mountain-Ok rather than to Lowland-Ok is lexical -- the 80 words from Sibil mentioned above, and a list of 60 words from Ngalum which the author once saw long enough (before it was accidentally burned) to count 85% cognates with Tifal.

1.4 LOWLAND-OK SUB-FAMILY, DIVISION A

SOUTHERN KATI (Southern Muju) is spoken on the lower Moejoe River in Irian Barat by perhaps 4,000 people.[12] The language spoken by the Kowan people on the Fly River at its westernmost point may well be a dialect of Southern Kati, but no sample of their speech is available to the author.[13] The most detailed study of Southern Kati was that made of the Metomka dialect by Fr. P. Drabbé. His published material included 450 words, a brief statement of the phonology, and a fairly extensive grammar that is most detailed for verb morphology and least detailed for syntax.[14] A list of 450 words (but a different selection from Drabbé's) from another dialect was published by Geurtjens under the name "Digoeleesch".[15] He claimed that this dialect was spoken on the Digoel River north of the Bian River. However, this area now seems to be uninhabited and

the present location of the speakers of this dialect is unknown to the author (unless they should prove to be the Kowan people). Another speciman of Southern Kati is the list of 110 words collected by Austen form the village of Anu. [16]

NORTHERN KATI (Northern Muju) is spoken on the upper Moejoe River in Irian Barat by perhaps 8, 000 people. Fr. Drabbé has published a detailed study of the Ninatie dialect of Northern Kati –450 words, brief phonology, and extensive grammar. [17] Austen collected a list of 110 words at the village of Kandem near the Ok Birim. [18] Dr. Schoorl has published a glossary of 160 anthropological terms from the village of Kawangtot. [19] Schoorl suggests that a separate dialect of Northern Kati is spoken in Kanggewot, and another in the village of Toemoetoo. This latter dialect is known as Are by the Ninggirum to the east, according to the present author's informant. A list of 190 words and sentences collected by R. Brown and R. Brett of the Summer Institute of Linguistics also seems to be from a dialect of Northern Kati.

YONGGOM (Yongom) is spoken along the Fly and Todi (Alice) Rivers, mainly in Papua. Two villages of Yonggom speakers also live on the shores of Lake Murray. The 1958 census figures have been analyzed to show 2,000 Yonggom speakers in Papua. It is assumed that there are very few in Irian Barat, and any that are there would have been counte above as speakers of Southern Kati, a closely related language. Yonggom word lists available include 100 words by the author form Oya No. 2, 90 words by Assistant District Officer J.W. Kent from Watakdum, and 110 words by Austen from both Marapka and Ort Ambip.

The above three languages are quite similar to each other and there seems to be a fair degree of mutual intelligibility between Northern Kati and Yonggom. It is possible that careful field research will uncover one or two more languages of this sub-group in Irian Barat. For example, Iwoer.

IWOER is the name tentatively given to the language of the people living in the valley of the Iwoer River (Ok Iwoer) in Irian Barat and eastwards almost to the Ok Denom. There is no clear evidence of the northern, southern or western boundaries of this group, but one concludes from a study of Dutch maps and writings that population is rather light in this area. It seems unwise to suggest more than 1, 000 speakers. [20] The status of this language within the Ok Family is quite unknown. However, seeing it is not a dialect of Ngalum, but is partly intelligible to Kati speakers, it may well belong to the Lowland-Ok Sub-Family and be similar to either Kati or Ninggirum. [21] The author has no sample of this language, and to his knowledge on one has studied it.

1.5 LOWLAND-OK SUB-FAMILY, DIVISION B

NINGGIRUM (Ninggeroem,Ninggirem, Ningirim) is the name which the Kati people gave to the Obgwo people living between the Ok Birim and Ok Tedi rivers, and the latter now accept it as their own name.[22] The Ninggirum language is spoken by the large group of that name, by the Kasiwa or Kativa group to their north, and by many smaller clans living in the same general area. The dialectal differences between the Ninggirum and Kasiwa are mainly ones of pronunciation. The Dutch 1956 census counted 1,078 Ninggirum, and the Australian officers had counted about 2,246 Ninggirum and Kasiwa in Papua by 1962 and estimated 200 to 500 more. Thus there are at least 3,500 speaking this language. For the Ninggirum dialect the author has 550 words and a little grammar, there are 80 words by Brown and Brett, and 90 words by Kent. For the Kasiwa dialect there are 90 words by Kent and 60 words by the author.

UPPER TEDI is a temporary designation for the language or languages spoken north of the Ninggirum language area. The author's guess is of a small population of 500 because of the rugged limestone country. Kent collected 90 words from the Katapka clan on the middle Ok Ma, Steinkraus obtained 60 words from the Denkayak people on the Tedi headwaters, and Austen has 30 words published from the head of the Tedi.[22a]

2. COMPARISON OF OK LANGUAGES

In comparing the languages of the Ok Family, the reliability of the statements about each language is in proportion to the quantity of data available and the opportunity for checking phonemic conclusions. The phonemic analyses of Tifal and Teléfól are quite reliable, and those of Mianmin, Southern Kati (both Digoel and Metomka) and Northern Kati are almost as reliable.[23] However, the phonemic descriptions of Angkiakmin (Faiwol), Bimin and Ninggirum are still rather tentative, and those of the other languages and dialects are little more than informed guesses, guided by comparison with better known languages, but based upon inadequate data.

The Ok languages have relatively small phoneme inventories; no language seems to have more than 14 consonants and 7 vowels. Every language includes in its inventory /a/, /e/, /i/, /k/, /m/, /n/, /ŋ/, /o/, /t/, /u/, /w/, /y/, /b/ or /p/, and /d/ or/r/ or /l/. All Mountain-Ok languages have /s/ and /f/ (or /p/), but none of the Lowland-Ok languages have /f/, though a few may have /s/.[24]

2.1 CONSONANTS

In Tables 1 and 2 the principal allophones of the consonants of Ok languages are presented in such a way as to show at the same time

TABLE 1. CONSONANT ALLOPHONES OF THE MOUNTAIN-OK LANGUAGES

Phoneme and Position	Div. C	Division A								Division B	
	NS	TA	TF	TW	KW	FI FF FW	FG FA FS	BM BK	TL	MN	WG
b-	b	b	b	b	b	b	b	b	b	-	
-b-	b	b	b	b		b	b	b	b	-	
-b	(b)	p	p	p^h/p	p	p	p	p	p	-	
p-	p		-			-		-	-	b/p	p/b
-p-	p		-			-		-	-	p	p
-p	p		-			-		-	-	p	(p)
t-	t	t/tš	t̂	t	t^h	t/t^h	t	t^h	t^ĥ	t^h	t
-t-	t	t/ts	t̂	t	t^h	t/t^h	t	t	t̂	t	t
-t	t	t/t^h	t̂	t^h	t	t	t	t	t̂	t	(t)
d-	d		d	d	d	d		-	d̂	-	d
-d-	(d)		d	ř	ř	ř		-	d̂	-	ř
(-d)			-			-		-	-	-	
r-		d	-			-	d	d	-	d	
-r-		ř/l	-			-	r/l	ř/l	-	ř	
-r		l	-			-	l	r̲/l	-	l	
l-	(l)		l	l	l	l		-	-	-	l
-l-	l/r		l	l	l	l		-	ř	-	l
-l	l/r		l	l	l	l		-	l	-	(l/r)
g-			-	g	g	g		g	-	g	
k-	k	k/k^h	k^h	k	k^h	k^h/k	k	k^h/h	k^h	k^h	k
-k-	g	g/g	g	g/k	g	g/g	g	g	g	k	k
-k	k	k	k^h	k^h	k	k	k	k	k	k	(k)
k^w-		k^w	(kw)		k^w	k^w	k^w	k^w	k^w	k^w	
g^w-			-			-		g^w	-	(g^w)	

TABLE 1 (cont.)

Phoneme and Position	Div. C	Division A								Division B	
	NS	TA	TF	TW	KW	FI FG FF FA FW	FS	EM BK	TL	MN	WG
m-	m	m	m	m	m	m	m	m	m	m	m
-m-	m	m	m	m	m	m	m	m	m	m	m
-m	m	m	m	m	m	m	m	m	m	m	(m)
n-	n	n	n̂	n	n	n	n	n	n̂	n	n
-n-	n	n	n̂	n	n	n	n	n	n̂	n	n
-n	n	n	n̂	n	n	n	n	n	n̂	n	(n)
ɡ-	ɡ		-			ɡ		-	-	ɡ	
-ɡ-		ɡ	ɡ			ɡ		ɡ	ɡ/ɡ̇	ɡ	ɡ
-ɡ	ɡ	ɡ	ɡ	ɡ	ɡ	ɡ	ɡ	ɡ	ɡ/ɡ̇	ɡ	(ɡ)
w-	w	w	w	w	w/ƀ	w	w	w	w	w	w
-w-	w	w	w	w	w	w/v	v	w	-	w	w
y-	y	y	y	y	y	y		y	y	y	y
-y-	y	y	y	y	y	y	y	y	y	-	
f-		f	f/p̄p̄	f	p̄	f/p̄p̄	f	f	p̄	f	f
-f-		f	f	f		f/p̄		-	p̄	f	f
h-			-			-		-	-	h	h
-h-			-			-		-	-	-	
-h			-			-		-	-	-	
s-	s	s	s	s/š	s	s	s	s	s	s	s
-s-	s	s	s			s		s	s	s	s
-s		s	s	s	s	s	s	s	-	s	(s)

TABLE 2. CONSONANTAL ALLOPHONES OF THE LOWLAND-OK LANGUAGES

Phoneme and Position	Division A					Division B		
	KD	KM	YM	KA	KN	NN	NK	UT
b-	b/mb	mb/b	b	b	-	b/p	b	b
-b-	p/b	p	b/p	b/p	-	b	b	b/b
-b	b/p	p	p	p	-	p	p	p
p-	-	-			p/b	-		
-p-	-	-			p	-		
-p	-	-			p	-		
t-	t	t	t/t	t	t	t^h/t^h	t/t^h	t
-t-	t	t	t	t/d	t	$t/\underline{r}$	t^h	t
-t	t	t	t	t/t	t	t	t	t
d-	d	nd/d	d	d	-	d/d	d	(d)
-d-	r	r	r/l	r/r	-	r		r/r
(-d)	d/r	-			-	-		r
r-	-	-			(d)	-		
-r-	-	-			r	-		
-r	-	-			-	-		
l-	-	-	(l)		-	(l)	l/l	l
-l-	-	-			-	-	r/l	l
-l	-	-			-	-		l
g-	-	-		ŋg	-	g/ŋg	g	
k-	k/g	k	k/k	k/k	g	k^h	k/k^h	k
-k-	k/g	g	k/g	k/k	g	g	k/g	g/k
-k	k	k/g	k	k/k	k/k^h	k	k	k/k^h
k^w-	-	-			-	-		
g^w-	-	-			-	-		

TABLE 2 (cont.)

Phoneme and Position	Division A					Division B		
	KD	KM	YM	KA	KN	NN	NK	UT
m-	m	m	m	m	m	m	m	m
-m-	m	m	m	m	m	m	m	m
-m	m	m	m	m	m	m	m	m
n-	n	n	n	n/n̂	n	n/ṅ	n	n
-n-	n	n	n	n	n	n/ṅ	n	n
-n	n	n	n	n/n̂	n	n/ṅ	n	n
ŋ-	ŋ	-			-	-		
-ŋ-	ŋ	ŋ		ŋ	-	ŋ	ŋ	ŋ
-ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	ŋ
w-	w	w	w/ɸ	w/ɸ	w/v	w/ɸ	w/ɸ	w/ɸ
-w-	w/b	w	w	w/ɸ	w/v	w/ɸ	w	w
y-	y	y/ž	y̯	y	y/ž	-		y
-y-	y/z	y/ž	y̯	y	y/ž	y	y	y
f-								
-f-								
h-			(h)	h		h	h	h
-h-						(h)		
-h	(h)					-		
s-						(s)	(s)	(s)
-s-							(s)	(s)
-s			(s)			(ts)		

the positional distribution of the consonant phonemes. The phonetic symbols employed are those found in Pike's Phonemics.[25] For Sibil (NS) and Kati (KD, KM, KN) the symbols bear almost a one-to-one correspondence to the orthographies of the published sources, and the same is true for a few items in Yonggom (YM), Kativa (NK) and Upper Tedi (UT). In particular, ng has usually been regarded as /ŋ/, and the j of Dutch authors has been written as /y/. A stroke (/) indicates both free and conditioned variants.

The velar nasal /ŋ/ is quite frequent in word-final position in all languages, but occurs only rarely in intervocalic position, and in fact no occurrence of it in intervocalic position is on record for Northern Kati (KN) nor for several of the languages for which only limited data are available. Word-initial /ŋ/ has been observed only for Mianmin (MN) and Angkiakmin (FA), and possibly for Digoel (KD) and Sibil (NS).[26] In several languages such as Teléfól (TL), /ŋ/, like /k/ and /g/, tends to be almost uvular when contiguous with central and back vowels.

The parentheses shown around all word-final allophones of Wagarabai (WG) indicate that these consonants occur as stem-final elements in connected speech, but that, due to the presence of suffixes or clitics, they should probably be regarded as intervocalic allophones. When stems are uttered in isolation the final consonant of the stem is almost always lost. The same phenomenon occurs to a lesser extent in connected speech.[26a]

The Ninggirum (NN) consonants /n/, /t/ and /d/ are retroflexed contiguous to /o/, /ɔ/ and /a/.

In Digoel (KD) five occurrences of word-final [h] have been recorded by Geurtjens. It may well be that this is a free variant devoicing of word-final vowel, in which case this [h] would not be shown in a phonemic transcription. However, quite a few Digoel words with word-final vowel correspond to words in the Metomka dialect (KM) with an extra word-final consonant, and the only two Digoel words with final [h] whose cognates have been identified in Metomka correspond to Metomka final /k/, namely, KD /bumoh/, KM /bumok/ 'spittle'; KD /kibih/, KM /kibik/ 'now'. Because of this, /h/ is tentatively assigned phonemic status in Digoel.

Most words which have initial vowel in the Ninatie dialect (KN) commence with [h] in the dialect of Northern Kati recorded by Brett and Brown (KA). This is also tentatively assigned phonemic status.

The occurrence of /h/ in intervocalic position in Ninggirum is rather uncertain, since most of the apparent occurrences prove to be word-initial upon closer investigation. Some probable occurrences are: /muhii/ 'nipple', /weŋ ahaanben/ 'dumb', and perhaps /koohai/ 'calf of leg'.

In Mianmin and Ninggirum a considerable number of vowel sequences occur. Although it would be possible to interpret sequences such as [ai] and [au] as /ay/ and /aw/ when they occur as syllable nuclei, the present tentative analysis regards them as /ai/ and /au/ to parallel other non-suspect vowel sequences such as /ae/, /ao/, /ea/, /oe/ and /eo/. This precludes the occurrence of /y/ and /w/ in word-final position. Vocoid sequences commencing with [u] and [i] are discussed below in section 2.4.

Ninggirum /w/ tends to be fricative [ɸ] or [v] preceding /i/ and /e/. A similar type of complementation seems to occur in Kativa (NK) and Upper Tedi (UT).

The phonemic status of [s] and [ts] in Yonggom, Ninggirum, Kativa, and Upper Tedi is uncertain. There are a few occurrences of these sounds, and there is some evidence that they may be conditioned variants of /t/ in these languages.

Sibil is the only language in which two bilabial stop phonemes /b/ and /p/ occur. The only evidence of this contrast available to the author is:

/pamin/	'a type of bow'	/baab/	'my elder brother'
/pik/	'his elder brother'	/bilminoŋ/	'plaited wristband'
/upi/	'earthworm'	/ŋobip/	'Jew's harp'
/awot mapom/	'snake sp.'	/ebon/	'a type of bow'

In the small amount of data available there are two occurrences of the cognates of final [b] and five occurrences of final [p]. From a consideration of the words containing these sounds, it seems likely that there is only one bilabial stop in word-final position. Whether this should be aligned with /b/ or /p/ may depend on morphophonemic considerations.

In the languages in which they occur, there is a clear contrast between /t/ and /d/ and between /k/ and /g/.[27] For example:

TF:	/ditiib/	'animal sp.'	/titiib/	'casuarina tree'
	/doolba/	'he writes'	/toolba/	'he stands'[28]
FA:	/duub/	'friend'	/tuub/	'breastbone'
	/dam/	'flesh'	/taŋ/	'smell'
	/kaduun/	'widow'	/katuun/	'knee'
	/waadim/	'rat sp.'	/naatim/	'my father'
	/gaal/	'scar'	/kaal/	'skin'
	/gatim/	'weak'	/kasim/	'earthworm'
Bil:	/raib/	'road'	/taib/	'upper arm'
	/riim/	'flesh'	/tiib/	'above'

	/kureb/	'bird of paradise'	/kuteb/	'ash'
	/karim/	'body hair'	/katin/	'knee'
	/goor/	'forked'	/koor/	'frog'
	/gimgim/	'mosquito'	/kimkim/	'root'
TL:	/dùl/	'scar'[29]	/tùl/	'fireplace'
	/dítíb/	'rat sp.'	/títíb/	'casuarina tree'
	/ɬòódeék/	'praying mantis'[30]	/bòótá/	'she'
MN:	/ràm/	'body'	/tàm/	'cheek'
	/rĭm/	'flesh'	/tĭr/	'dog'
	/ĺrăm/	'rat sp.'	/ítám/	'dance'
	/kùrăn/	'meat'	/kùtàp/	'ash'
	/gát/	'dry wood'	/kàt/	'thin'
	/gìr/	'cold'	/kìn/	'eye'
KD:	/dabadem/	'to weed'	/tabandem/	'bleeding'
	/dinama/	'dig'	/tinim/	'bow'
	/kudub/	'long'	/tana kutub/	'boy'
	/adeŋ/	'cry'	/aten/	'gnat'
KM:	/daya/	'wall'	/tama/	'termite'
	/dine-/	'descend'	/tide-/	'sit'
	/adob/	'two'	/aton/	'sun'
	/idib/	'widow'	/mitik/	'night'
KN:	/ruk/	'(finger)nail'[31]	/tuk/	'short'
	/eren/	'leech'	/eten/	'mosquito'
	/kiri/	'new'	/am kiti/	'night'
NN:	/don/	'leg'	/tom/	'cockroach'
	/deŋ/	'32 (counting unit)'	/tem/	'hole'
	/adon/	'sun'	/otom/	'coconut'
	/on kidim/	'crown pigeon'	/kitim ben kadidin/	'deaf'[31a]

The status of word-final /d/ in Digoel is in doubt, despite the occurrence of word pairs that appear to show a contrast with /t/, e.g. /wod/ 'moon', /bot/ 'stone'; /tamad/ 'stone adze', /yamat/ 'temple (head)'. Drabbé states for the Ketomka dialect that /d/

occurs at the end of a word only as an allomorphic variant of word-final /t/ when the following word commences with a vowel.[32] Geurtjens' list contains just one clue to such an alternation between /t/ and /d/ in Digoel: the word 'skin' is transcribed in various entries in the list as both /kat/ and /kad/.

The complex consonant /k^{w}/ occurs only in some of the Mountain-Ok languages. The same phonetic sequence [kw] occurs rarely in Tifal, but there Steinkraus has interpreted it as a consonant cluster /kw/. Mianmin may contain a complex consonant /g^{w}/, but more data is needed to substantiate this suggestion. Ninggirum seems to have word-initial (and syllable-initial) consonant clusters, with the first item of such a cluster being almost any consonant (/y/ has not been observed there yet), and the second item being /w/ or /y/. The contrasts between /ty/ and /ky/ and between /dy/ and /gy/ appear to be neutralized, resulting in a single pair of palatal stops with slight [y] off-glide. However, this needs checking. Many words seem to commence with a consonant cluster whose second element is /d/ (= [ř] in this context). Nevertheless, it is possible that such words may prove to have a very short vowel phoneme between these two consonants, as happens in Teléfól.[33]

Of the three phonemes /d/, /r/, and /l/, some languages have just one (/d/ or /r/), and other languages have both /d/ and /l/. In these latter languages intervocalic and word-final [ř] has been allotted to /d/ unless there is positive evidence of it being an allophone of /l/. In quite a few of these languages the phonemic status of [ř] remains in doubt despite this arbitrary assignment to /d/, and the best examples of apparent contrast between /d/ and /l/ (including [ř] versus [l]) are listed below for each language. These may be a starting point for future phonological enquiry in the field.

NS:	/daloki/	'large'	/lempeŋ/	'flattened plug of tobacco'[34]
TF:	/daaŋ/	'edge'	/laŋ/	'garden'
	/dan/	'sap'	/lab/	'fruit'
	/diil/	'25'	/liib/	'road'
	/dil/	'parrot sp.'	/lik/	'snake sp.'[28]
TW:	/dabal/	'forehead'	/lib/	'road'
	/tidoŋ/	'ear'	/filaŋ/	'tongue'
	/tedikun/	'knee'	/ilim/	'blood'
KW:	/daaŋ/	'back'	/laib/	'road'
	/tadik/	'knee'	/falaŋ/	'tongue'

FI:	/dabal/	'forehead'	/leib/	'road'
	/debom/	'head'	/lek/	'smoke'
	/tudaŋkal/	'ear'	/falaŋ/	'tongue'
FG:	/dum/	'dream'	/lumloob/	'heart'
	/dal/	'scar'	/lalaaŋ/	'white'
	/daŋ/	'itchy'	/lain/	'a boil'
	/kadun/	'widower'	/kaluun/	'ear'
	/buduŋ/	'(finger)nail'	/sulub/	'navel'
	/kadeel/	'wife'	/kalim/	'body hair'
FF:	/deŋ/	'27 (counting unit)'	/lek/	'smoke'
	/dukak/	'corn'	/luwaankal/	'eight'
	/madi/	'side'	/kaalim/	'feather'
	/tadeŋ/	'sweet potato'	/aleb/	'two'
FA:	/dabaal/	'face'	/lakan/	'forked'
	/dumnoob/	'heart'	/luwaan/	'elbow'
	/daaŋ/	'back'	/lain/	'a boil'
	/dub/	'seed'	/luŋ/	'green'
	/buduŋ/	'(finger)nail'	/sulub/	'navel'
	/madankun/	'rib'	/falaŋ/	'tongue'
	/kadeel/	'wife'	/kalim/	'hair'
FW:	/delaŋ/	'white'	/laib/	'road'
TL:	/fòódeék/	'praying mantis'[30]	/tòòlíím/	'directly'
WG:	/dudinalim/	'sand'	/lepu-te/	'road'
	/didono/	'knee'	/lipalo-te/	'ground'
	/dudupa/	'cold'	/lapo-te/	'finger'
	/kadano-te/	'ear'	/kalodo-te/	'wind'
	/nadido-te/	'liver'	/yipikalie-te/	'moon'
UT:	/dyum/	'banana'	/lon/	'foot'
	/midu/	'nose'	/niŋilob/	'tooth'
	/oon-idi/	'egg'	/okglilin/	'sand'
	/idokbon/	'white'	/kilob/	'eye'

/kedahol/	'ear'	/malabmi/	'forest'
/-kad/	'skin'	/tuul/	'fat', 'grease'

The dialects of Kativa (Kasiwa) and Upper Tedi recorded by Kent have no word-initial /l/, but only /d/. It is assumed that Sibil [r] and [l] are allophones in all environments, since Brongersma and Venema mention free variation between them. The only example they give is [yamburgi]/[yambulgi] 'small'.[35] In Gipman final /l/ tends to be [ř] following front vowels and [l] following central and back vowels. In Bimin final [ř] and [l] are in free variation; and this seems to be true for Wagarabai also.

2.2 VOWELS

Most Ok languages have just the five vowels /a/, /e/, /i/, /o/, and /u/. The approximate phonetic value of these vowel phonemes in most languages is (in Pike's symbols) as follows: /a/ ranges between [ɑ] and [ʌ], and sometimes includes [a] and [ə]. /e/ ranges between [ɛ] and [e]. /i/ ranges between [i] and [ɪ], and sometimes tends towards central [ɨ]. /o/ ranges between [ɔ] and [o]. /u/ ranges between [u] and [ʊ], and sometimes tends towards central [ʉ]. Mianmin has a sixth vowel /ą/. It is essentially a nasalized vowel, though with some speakers one has the impression that laryngealization is an important component. The situation is slightly confused by the presence of non-phonemic (predictable) laryngealization on /a/ and /ą/ when they have a rising toneme / ˇ /. Some examples of the contrast between /a/ and /ą/ are as follows:

/àr/	'excreta'	/a̰r/	'skin'
/sà/	'vine'	/a̰/	'water'
/màt/	'gall bladder'	/ma̰/	'stand up'
/wǎn/	'sweet potato'	/hą̌m/	'corpse'

Wagarabai seems to have a similar sixth nasalized vowel phoneme too.

The analysis of Ninggirum vowels is complicated by the occurrence of several vowel glides. Also, in addition to the five common vowels, Ninggirum seems to have two further vowels, /æ̯/ and /ɔ̯/ (phonetically [æ̯] and [ɒ̯]). Further checking is needed to show that these vowels are not variants of glides /ae/ and /ao/ or of geminates /ee/ and /oo/. The best contrastive evidence for these two vowels that is available is:

/kudeb/ 'ashes'	/awidæb/ 'married woman'	/badaab/ 'ground'
/kawee/ 'widow'	/tawæ̯æ̯ kwien/ 'die'	/kuwaa/ 'belly'
/duen ben/ 'tomorrow'	/ą bæn/ 'tree sp.'	/ini wan/ 'ginger'
/ą woo/ 'tree sp.'	/wɔɔ/ 'moon'	/waa/ 'alive, ghost'
/naŋoog/ 'finger'	/taŋɔɔn/ 'armpit'	/daŋaab/ 'paddle'

In addition to this, Ninggirum appears to have contrastive nasalization of its vowels. However, the author suspects that there may also be non-phonemic nasalization associated with nasals and perhaps with /h/. The contrastive status of nasalization needs further checking. The best evidence to hand is presented below:

/ka/ 'person'	/a̰/ 'tree'	
/keehoo/ 'ear'	/a̰ ho̰o̰/ 'leaf'	
/haai/ 'cry'	/ha̰ḛ/ 'hold', 'make'	/koohaḭ/ 'shin'
/am kwen/ 'floor'	/hwḛn/ 'swollen'	
/kwim/ 'louse'	/nwḭm/ 'grandmother'	

In both Mianmin and Ninggirum the evidence seems to be against interpreting a nasalized vowel as vowel plus nasal consonant, but further checking of this is needed.

In Angkiakmin [æ] is an allophone of /e/ that precedes /ŋ/.

In all Ok languages for which adequate information is available long and short vowels contrast, perhaps with the exception of Mianmin (and Wagarabai?). In most of the languages these long vowels have been interpreted as geminates (VV), but in a few such as Tifal they have been interpreted as single vowels (V:).[36] For the sake of ease of comparison all phonemically long vowels have been written here as geminates (VV). However, this is not intended to prejudice against any future analysis of any of these languages as containing single long vowel phonemes (V:). The best available evidence for contrastive vowel length for each language is listed below.

NS:	/tabal/	'right hand'	/kobaal/	'aeroplane'
	/im/	'husband'	/niiŋ/	'younger brother'[37]
TA:	/tim/	'louse'	/tiin/	'eye'
	/kum/	'eleven'	/tuum/	'stone'
	/wan/	'arrow'	/waan/	'sweet potato'
TF:	/mít/	'fourteen'	/miít/	'multiple stem growth'
	/wán/	'arrow'	/waán/	'sweet potato'
	/kùm/	'eleven'	/kuùm/	'tree sp.'[38]
KW:	/man/	'child'	/yaan/	'foot'
	/kim/	'louse'	/kiin/	'eye'
	/kun/	'bone'	/tuum/	'stone'
	/yaman/	'taro'	/mayaan/	'dog'

FG:	/foŋ/	'throat'	/foom/	'corpse'
	/man/	'child'	/yaan/	'foot'
	/dal/	'scar'	/kaal/	'skin'
	/kim/	'louse'	/kiin/	'eye'
	/kun/	'bone'	/tuum/	'stone'
	/buduŋ/	'(finger)nail'	/kaluun/	'ear'
FF:	/win/	'egg'	/kiin/	'eye'
	/kun/	'strong'	/suum/	'banana'
	/man/	'child'	/yaan/	'leg'
	/iman/	'taro'	/imaan/	'urine'
FA:	/dam/	'body'	/daam/	'fence'
	/wun/	'arrow'	/muun/	'paddle'
	/kim/	'louse'	/kiin/	'eye'
	/win/	'egg'	/fiim/	'blunt'
	/kul/	'frog'	/kuul/	'core of boil'
FW:	/kim/	'louse'	/kiin/	'eye'
	/am/	'house'	/maan/	'dog'
FS:	/kim/	'louse'	/kiin/	'eye'
	/am/	'house'	/maan/	'dog'
BM:	/bim/	'earthquake'	/riim/	'flesh'
	/mem/	'breath'	/meen/	'net-bag'
	/yoŋ/	'garden'	/yoom/	'ripe'
	/fur/	'pointed'	/muur/	'back'
	/am/	'house'	/naam/	'cuirass'
	/kunum/	'man'	/karuun/	'widow'
TL:	/dàl/	'kidney'	/dààl/	'bamboo sp.'
	/kùm/	'eleven'	/kùùm/	'tree sp.'
	/ìb/	'dust'	/ìib/	'centre'
	/ùnìn/	'eat'	/ùùnìn/	'roar'
	/óókénàl/	'his aunts'	/óókénaàl/	'his grandfather'[39]
KD:	/ab/	'tree'	/taab/	'thin', 'bad'
	/man/	'basket'	/kaam/	'dry'

	/yemen/	'loam'	/yeemen/	'taro'
	/bedon/	'small'	/beedab/	'club'
KM:	/wot/	'drum'	/woot/	'moon'
	/it/	'body'	/iib/	'enough'
	/tama/	'termite'	/taamat/	'stone adze'
	/ben/	'hand'	/meen/	'net-bag'
	/mun/	'child'	/uun/	'sugar cane'
	/ambaŋ/	'elder sibling'	/ambaan/	'wife'
YM:	/yom/	'body'	/yoom/	'old man'
	/kono/	'bone'	/konoo/	'boat'
	/kok/	'hard'	/kook/	'bitter'
	/kat/	'skin'	/taas/	'scar'
KN:	/pa/	'marsupial'	/taa/	'stone adze'
	/wetme-/	'see'	/yeetme-/	'say'
	/mim/	'one'	/niin/	'snake'
	/wot/	'star'	/woot/	'moon'
	/pun/	'outside'	/kuun/	'heavy'
NN:	/wa/	'deep'	/waa/	'alive'
	/ka/	'person'	/kaa/	'skin'
	/dam/	'fence'	/daam/	'blood'
	/wi/	'broad'	/wii/	'dark'
	/dum/	'dream', 'banana'	/guum/	'placenta'
NK:	/ka/	'man'	/kaa/	'skin'
UT:	/muk/	'breast'	/huub/	'wind'

Information on length has not been recorded in the word lists for TW, FI, BK, WG, and KA.

2.3 TONEMES

All of the Mountain-Ok languages which have been adequately examined have been found to have lexical pitch. This pitch is contrastive on each syllable of a word, with the occasional exception of the first syllable.

Tifal has two register tonemes, high /ˊ/ and low /ˋ/. Each syllable carries one toneme except that an initial short syllable is

toneless. All possible toneme combinations seem to occur in polysyllabic words. E.g.

/tìb/	'tree sp.'	/tíb/	'brown'
/dììb/	'vegetable sp.'	/diíb/	'cheek of pig'
/kamàn/	'snake sp.'	/tamán/	'thunder'
/boòtoòk/	'animal sp.'	/kaábaàk/	'steel axe'
/taàwaál/	'sweet potato sp.'	/boónkoón/	'whiskers'[38]

There is regressive internal tonal sandhi between a verb stem and an all-low suffix, and progressive external tonal sandhi between an all-low word and the following word(s). E.g.

/falám-/ 'swim' + /-òkòmà/ 'he will' > /falàmòkòmà/ 'he will swim'

/fìk/ 'his elder brother' + /tambál/ 'good' > /fìk tambàl/ 'his good elder brother'[40]

Teléfól has two step tonemes, up / ˊ / and down / ˋ /; and on contracted syllables the much rarer sequences up-down /ˆ/ and down-up /ˇ/ occur. All possible sequences of two, three and four tonemes occur on polysyllabic words. The long nucleus of an initial syllable carries two tonemes whereas an initial short nucleus carries only one toneme. This is a remarkable parallel with Tifal where initial long and short nuclei carry one and zero tonemes respectively. E.g.

/kùl/	'frog'	/kúl/	'hand'
/dòòl/	'screwpine sp.'	/dòól/	'tree sp.'
/dóòl/	'insect sp.'	/dóól/	'forked'
/dìnìn/	'to build'	/dìlím/	'mistletoe sp.'
/dúlìn/	'taken'	/dílím/	'rat's teeth marks'
/bààlìn/	'wide'	/òòlsák/	'anger'
/dàálìn/	'placed'	/dàálín/	'Put it!'
/dóòlìn/	'born'	/dóòlí/	'I gave birth'
/dáálìn/	'planted'	/dáálín/	'Plant it!'[39]

There is internal tonal sandhi (both progressive and regressive) between a verb or noun stem and its suffix, and progressive external tonal sandhi in certain syntactic constructions.[41]

A preliminary analysis of Mianmin monosyllables reveals just three contrastive pitch patterns which have been tentatively assigned tonemic status: high / ˊ /, low falling / ˋ /, and low rising / ˇ /. All three tonemes are frequent and there are many examples of their contrast. Vowels with high tone tend to be slightly shorter than those with the other two tonemes. However, pitch rather than length

is the more consistent differentiating feature between contrastive sets of words. E.g.

/rár/	'shallow'	/ràr/	'bamboo sp.'	/gǎr/	'tired'
/ráŋ/	'garden'	/bàŋ/	'yam'	/rǎŋ/	'back','current'
/á̱n/	'arrow'	/â̱m/	'house'	/ǎ̱n/	'hair'
/mén/	'small'	/nèŋ/	'young sister'	/mĕn/	'net-bag'
/bír/	'wild banana'	/gìr/	'cold'	/bĭr/	'valley'
/mók/	'stone adze'	/kòk/	'bitter'	/sŏk/	'rain'
/úm/	'egg'	/tùm/	'smoke'	/fŭm/	'blunt'

A careful examination of polysyllabic words may eventually lead to an analysis of Mianmin in terms of two tonemes (rather than three) plus phonemic (rather than allophonic) vowel length.

It may be asked why such emphasis is placed upon monosyllables in the identification of pitch contrasts (as in the Mianmin examples above and in those of several other languages below). Provided a language has an adequate number of monosyllabic words, the identification of pitch contrasts among these is a fairly sure indication of the pitch being phonemic at the lexical level. If pitch contrasts are only identified on polysyllabic words and the number of such contrasts is small, then there is a considerable likelihood that the pitch phenomena are a non-phonemic concomitant of phonemic stress. However, even when the contrastive nature of pitch is identified with monosyllables, it is essential to examine longer words thoroughly to determine the number, nature and distribution of the tonemes.

In private communications Dr. Anceaux mentioned that Sibil words have phonemic pitch and C.F. Horne mentioned that either tone or stress is phonemic in the Ngalum dialect spoken at Kiwirok. Unfortunately the author has no examples to document these statements.

Several other languages and dialects of Mountain-Ok have been studied sufficiently to cite examples showing pitch contrasts, but no analysis of their tonemic systems has yet been undertaken. In the following examples approximate phonetic pitch is marked as high (´), low level or low falling (`), high falling (ˆ) or low rising (ˇ).

TA:	/kîl/	'tooth'	/mĭl/	'bean'
	/yôn/	'lizard arrow'	/yŏm/	'taro knife'
KW:	/wàán/	'sweet potato'	/yààn/	'foot'
FG:	/mán/	'child'	/âm/	'house'
	/tùúm/	'stone'	/súùm/	'banana'

FF:	/yôm/	'flying fox'			/yŏm/	'bamboo knife'
FA:	/tùúm/	'stone'			/súùm/	'banana'
	/ĕm/	'house'			/mân/	'child'
	/ɨ̀ín/	'nasal mucus'			/kɨ̀ín/	'eye'
	/dàáŋ/	'back'			/dáàŋ/	'current'
BM:	/síír/	'vine bridge'			/sɨ̀ɨ̀r/	'needle'
	/sáŋ/	'story'			/àm/	'house', 'day'
	/fím/	'blunt'			/bɨ̀m/	'earthquake'
	/kɨ̀ín/	'eye'			/kíɨ̀ŋ/	'shoulder'
	/nòón/	'breast'			/yòòm/	'ripe'
	/kóór/	'frog'			/òòr/	'intestines'
	/gíík/	'red'	/tíɨ̀b/	'above'	/bɨ̀ɨ̀t/	'valley'
	/méén/	'net-bag'	/yèém/	'my mother'	/wèèŋ/	'voice'
	/dúúb/	'perspiration'	/súùk/	'tobacco'	/nùùk/	'possum'

Although all the Mountain-Ok languages appear to have contrastive lexical pitch, the situation in the Lowland-Ok languages is not at all as clear-cut. The author has been unable to find any convincing evidence of contrastive pitch in Ninggirum. However, sufficient variation in the pitch and stress patterns of polysyllabic words has been observed to suggest the possibility of some kind of phonemic accent on words. E.g.

/'kaami/	'hair'	/taa'mi/	'to mate'

Kati has non-phonemic accent, the exact nature of which Drabbé has not specified. The primary accent occurs on the final syllable of monomorphemic words, and on the final syllable of the first root of a compound. All cases of non-final primary accent whose compound status is not obvious at first glance are indicated by Drabbé with a grave accent symbol.[42] Drabbé mentions that though Kati has a musical intonation he does not think the tones to be relevant at the lexical level.[43] However, the present author's data from Yonggom, a language very closely related to both Kati languages, indicate that this language does have contrastive lexical pitch. E.g.

/yòn/	'leg'				/yóm/	'flesh'
/ôn/	'bird', 'fish'				/óm/	'sago'
/bòt/	'stone'				/wót/	'drum'
/yòòm/	'old person'	/kòók/	'bitter'		/óóŋ/	'tongue'

2.4 CV PATTERNS

It was Kent who first observed the high frequency of closed syllables in the Ok languages.[44] This is quite well illustrated in the sample lists of words in the section on lexicostatistics below, and has been discussed in detail for Teléfól.[45] For most, if not all, of the Ok languages a word may fairly adequately be described as a combination of syllables of any one of the following patterns: V, VC, CV, CVC, VV, VVC, CVV, CVVC. For Ninggirum additional patterns appear to occur: CCV, CCVC, CCVV, CCVVC. The Mountain-Ok languages of Division A seem to have the highest frequency of closed syllables, and Wagarabai may prove to have the highest frequency of open syllables. For all languages, a single consonant is the most usual in the intervocalic position, consonant clusters CC (also CCC for Ninggirum) are also fairly frequent, and hiatus (i.e. lack of consonant between the vowels of two successive syllables) is relatively rare. The particular consonant clusters which occur in intervocalic position are a selection of all the theoretically possible combinations of word-final and word-initial consonants for the particular language.[46] The consonant combinations which do not occur are characteristic of the particular language and are correlated with the types of internal consonantal sandhi operating in that language. So far, Teléfól remains the only language for which full information is available on clusters and morphophonemics of consonants. Some evidence concerning the other languages emerges in an incidental fashion when the morphemes of the parent languages are reconstructed.[47]

Details of word-initial (and syllable-initial) consonant clusters in Ninggirum are given in section 2.1. Steinkraus has analyzed Tifal as having word-initial consonant clusters also, but examples are so rare that one wonders whether Tifal has "missing" vowels in these apparent clusters as does Teléfól.[48]

In many languages the only VV clusters that occur as the nucleus of a single syllable are sequences of like vowels (geminates). However, quite a few languages also have one or two sequences of unlike vowels, usually /ai/ or /ei/ and /au/ or /ou/. These cannot be interpreted as /ay/ and /aw/ since they occur as nuclei of closed syllables. E.g. FA /kail/ 'teeth', BM /auk/ 'thumb'. Ninggirum and Mianmin (and probably the other languages in their Divisions) appear to have many more vowel sequences. More field study is needed to identify each of these sequences contrastively. In the case of Ninggirum careful attention will need to be paid to contrasts of syllabicity of vocoids, since the syllable patterns set up above leave room for a contrast between patterns CuV and CwV and between CiV and CyV, for instance.

In the case of Ninggirum it may be asked why a word-initial set of consonant clusters of the type Cw and Cy have been postulated

when there is a clear basis for postulating VV as a syllable nucleus and assumedly words of the type CwV and CyV could be interpreted instead as CuV and CiV. Such a vocalic interpretation would then leave Ninggirum without initial consonant clusters, and in much better agreement with the rest of the Ok languages. However neat and uniform such an analysis might be, there seem to be a few Ninggirum words that preclude it, words that require a pattern CCVV(C). E.g. /twocni/ 'jump', /hyuuk/ 'perspiration', /bwiib/ 'thick', /bwem kwei/ 'gather (stones)', /kwææ/ 'open', 'show', /tabææ kwien/ 'die', /dyaa/ 'side of body', /a gyeem/ 'tree sp.', /awon twaa/ 'possum', /mwoe/ (/mwee/?) 'buy', /hwii/ 'count', /kyoob/ 'eye', /tyon tyaa/ 'eel', /on nyaa/ 'bird sp.', /monbwii/ 'to cut'.

2.5 NOUNS, ADJECTIVES, NUMERALS AND PRONOUNS

Kati and Teléfól both have a weak system of two genders.[49] No information is to hand on the other languages. Gender of a noun is manifested in the agreement of an accompanying pronoun within the same noun phrase, the agreement of the subject-person suffix or object-person prefix of the verb of the clause to which the noun is subject or object, and the agreement of a pronoun in a later clause for which this noun is the andecedent. For humans the gender parallels the sex. Some non-human nouns have a fixed gender, but others may be either gender. In Teléfól the guiding principle in these cases is that small things are masculine and large things feminine. This principle is sometimes applied in terms of absolute size and sometimes in terms of the size of a particular specimen relative to the norm for that species. Thus, /tùúm úyoó/ (stone she) would imply a stone or rock and /tùúm íyoó/ (stone he/they) would imply a pebble. The usage of variable gender in Kati has not been examined in detail yet, but it may well be similar to that of Teléfól. For example, when feminine, Northern Kati /ok/ refers to water in a river or well, and when masculine it refers to water in a vessel or to sap. When feminine, /niŋkampo/ refers to animal teeth, and when masculine it refers to human teeth.

Plurality is often not formally marked if the context is clear. Plurality of humans may be indicated by a following plural pronoun, usually in the third person. E.g. KN /tana yi pet/ 'the children' (child they subject-marker), TL /tànúm bìlíb íyoó/ 'the men' (man those he/they), FA /man iyo/ 'children' (child they). Plurality of kinship terms is expressed by adding a suffix or postclitic: KM, KN /-a/, TL /-al/, and perhaps TF /-al/, BM /-er/. E.g. KM /taman/, KN /oni/, TL /bàábeén/ 'elder sister'; KM /taman-a/, KN /oni-a/, TL /bàábénàl/ 'elder sisters'. Plurality may also be indicated by complete reduplication of the noun (or sometimes adjective). However this is not very frequently used in Kati and is quite rarely used in Teléfól. E.g. KM, KN /katuk/ 'man', /katuk-katuk/ 'people', TL /tànúm bìseél-bìseél/ 'adults' (man big-big), MN /afapafaŋ/ 'twins'.

At some historical stage of these languages a process involving reduplication of monosyllables seems to have obtained, as many Ok languages have what might be called "duplex" stems (including adjective and verb stems as well as noun stems). In some of the languages few of these duplex stems have retained their original shape due to reduction of the medial consonant cluster. Often the monosyllable which may be recognized within these duplex stems does not occur as a free form in the present-day language with any plausibly related meaning. Some examples from the various languages are: TL /bàlbàl/, /bàbbàl/ 'caterpillar', /tɨ̀mtɨ́m/ 'root'; TF /timtim/, /tamtim/ 'root', /mɨ́mɨ̀mɨ̀/ 'bee'; BM /niŋniŋ/ 'thorn', /gimgim/ 'mosquito'; MN /daŋdaŋ/ 'chest', /kimkim/ 'root'; FA /wok niŋniŋ/ 'sand', /kimkim/ 'root'; KN /yepyep/ 'slippery', /kinkin/ 'soul'; KM /kiŋkin/ 'soul', /obob/ 'voice'; NN /tiktik/ 'grass sp.', /mokmok/ 'sour'.

All of the Ok languages seem to have compounds among their inventories of nouns. The vast majority of those examined are made up of two noun roots, presumably in a possessive construction when the compound was originally formed. A typical example in the Mountain-Ok languages is: TL /dɨ̀ɨ́tɨ́kɨ̀l/, TF /dɨ́tɨ̀kɨ̀l/, FA /gutukul/, BM /kaktukuu/ 'bald'. In each case the first syllable probably meant 'head' in the parent language, and the second and third syllables meant 'fat' or 'white growth'.[50]

Teléfól has four derivational suffixes for common nouns (/-im/, /-aal/, /-een/, /-ook/ and their tonal allomorphs) and a considerable number of personal name endings. All of these occur with noun stems to form nouns. Many of these suffixes and endings (an "ending" may consist of one or more suffixes) tend to mark the noun they form as either masculine or feminine. Cognates of the four common noun suffixes have been recognized in most Mountain-Ok languages, and several other suffixes as well, but considerably more field work will be needed before it will be possible to say how active these suffixes are in the noun morphology of each language. Derivational noun suffixes are not mentioned by Drabbé for Kati, and the author has not been able to identify any positively for Ninggirum.

In all of the Ok languages for which there is information, adjectives seem to be a smaller word class than in English. Many English adjectives are translated as verbs or verbal phrases in Ok languages. A few Teléfól and Northern Kati adjectives are reduplicated for plurality, but otherwise adjectives do not change for number or gender. Two of the four derivational suffixes of Teléfól mentioned above (/-im/ and /-een/) occur with some adjectives. For Southern Kati Drabbé lists /-mo/, /-yib/, and /-kondi/ as suffixes which change nouns to adjectives. For Northern Kati he lists /-mo/, /-eep/ or /-iip/, /-ta/, /-ti/, /-tee/, /-kutip/ and /-kin/ as adjective-forming suffixes, most of which occur with nouns, some with verbs (infinitive form), and some with adjectives. In

Ninggirum /-boo/ and /-bɔɔ/ occur with many adjectives.

All of the Ok languages except Minamin and Wagarabai appear to use the round-the-body method of counting. When counting, a person points successively to various parts of the body, and the numerals mostly consist of some recognizable form of the body-part names. One circuit of the body is a counting unit. Large numbers are specified as so many units (circuits) plus such-and-such a number (body-part).

The languages of Mountain-Ok Division A have a counting unit of 27, termed TL /dèéŋ/, TF /deeŋ/ FA /deŋ/ and BM /fuu deŋ/. Counting commences with the little finger, usually of the left hand, progresses up the arm, around the various parts of the head, and down the other arm to the other little finger (except that Bimin seems to finish with the thumb).[51] The nose is the highest point reached on the body and it represents 14; all other body-parts occur twice in the series 1-27. To avoid ambiguity a morpheme (such as TL /mìlíí/, TF /màlíí/, FA /malii/, BM /mari/ 'other side', and NS /tabal/ 'right hand side') is often postposed to numerals between 14 and 27 to indicate that the particular body-part is on the other side of the body from the starting point.[52] E.g. TL /tìín/ 'thirteen' (eye), /tìín mìlíí/ 'fifteen' (other eye).

In Ninggirum (of Lowland-Ok Division B) a similar method of counting is used, but there the counting unit /deŋ/ is 32, the repeated highest point is the side of the nose for 16 and 17, and the morpheme /haŋgaa/ may be preposed to numerals between 17 and 32 to avoid ambiguity.

Southern Kati and Northern Kati (Lowland-Ok Division A) use half of a round-the-body system.[53] Counting commences with the little finger and reaches the crown of the head for 12. Above 12 a senary counting system is used, the counting unit of 6 being /ayet/ in Southern Kati and /wat/ in Northern Kati.

In many languages there is a distinction between the words used in the process of counting (i.e. numbers) and the numerals (English numeral adjectives). Firstly, the numerals up to five are often entirely different words from the corresponding numbers. In the following examples the number (counting word) is given first, then the numeral.

FAIWOL: 1 /batkatkat/, /maakas/; 2 /katkatkamaam/, /aleb/; 3 /waninwanin/, /asuno/; 4 /dil/, /alaleb/.

BM: 1 /katket/, /makubmaak/; 2 /katketaben/, /areeb/; 3 /yamamas/, /aremsaar/; 4 /auktaben/, /aremiareb/; 5 /auk/, /teŋebi/.

NN: 1 /ketket/, /mwim/; 2 /ketketimmoŋ/, /hadob/; 3 /dabtem/, /kadowaamim/; 4 /aŋadimmoŋ/, /kwandimben/.

Secondly, the numerals above five usually consist of the corresponding number plus a post-posed morpheme that is in many languages the syntactic marker of locative expressions (such as TL, TF, FA /kal/, BM /ker/ 'at' and NN /ben/). For example, TL /bàn/ 'seven' (forearm) is used in counting and /bàn kàl/ or /bànkàl/ 'seven' (forearm at) is used in expressions such as 'the seven men'.

Mianmin (of Mountain-Ok Division B) does not use the around-the-body method of counting. Its numerals only go up to four or five, and these seem to have no cognates in the number systems of the languages of the other Divisions of the Ok Family. The same appears to be true of Wagarabai counting. These are "Australian" numerals.[53a]

All of the Ok languages for which information is available have separate pronouns for 'I', 'you masc.', 'you fem.', 'he/it', 'she/it', 'we', 'you pl.', and 'they'.[54] Ninggirum alone has an additional distinction, that between 'we inclusive' and 'we exclusive'. The known pronoun roots for each language are listed in Table 3.

In the Lowland-Ok languages the pronoun roots are free forms. On the other hand, in some of the Mountain-Ok languages the pronoun roots are bound forms, and in all of the Mountain-Ok languages examined there are several suffixes which occur with pronoun roots. The suffixes observed occurring with pronouns so far are as follows.

TL: /-oó/, /-tá/, /-mí/, /-soó/ or /-sìnoó/, /-kàl/, /-kál/, /-siik/, /-leé/, /-táb/, /-sìnoón/, /-kúb/, /-ká/, /-bà/, /-aà/ or /-eè/, and /-tákúb/.

TF: /-yoo/, /-ta/, /-mi/, /-soo/, /-kal/, /-i/, /-tab/, /-kub/, and /-a/.

FA: /-yo/, /-ta/, /-mi/, /-soo/, /-kal/, /-siik/, and /-a/.

BM: /-tee/, /-mi/, and /-karemte/.

NN: /-o/, /-ta/, /-mi/, and /-tem/.

The majority of suffixes with pronouns appear to be syntactic markers of one kind or another, but no attempt is made to describe their various usages here.[55]

Several of the Mountain-Ok languages have a second set of pronoun roots containing a medial /l/ or /r/, and these roots only take a few of the suffixes that occur with pronoun roots. In Teléfól these roots with medial /l/ are more emphatic than the main set of roots. Table 3 lists all of the pronoun roots with medial /l/ that have been observed so far.

2.6 VERBS

Although the identification of verb stems in the Lowland-Ok languages of Division A seems straightforward in that stem allomorphs

TABLE 3. PRONOUN ROOTS

TL	TF	PA	BM	MN	KM	KN	NN	Meaning
ni-) na-)	na-	na-	ne	ne-	ne	ne	ne	'I'
nu-) no-)	nu-	nu-	nuu	ni-	nub	nup	ni)* nib)	'we'
kub-	kub-	kub-	ku) koo-)	op-	kub	tup	kub	'you f.'
kab-	kab-	kab-	kab-) koo-)	kep-	eb	tep	keb) kyeb)	'you m.'
ib-	ib-	ib-	yuu) yoo-)	ip-	kib) yib)	tip	dib	'you pl.'
u-, o-	u-	u-	u	o.-	yu	yu	du	'she'
i-	a-	a-	e	e-	ye	ye	de	'he'
i-	i-	i-	i	i-	yi	yi	di	'they'
Emphatic Pronoun Roots								
nala-	nila-	nala-		nere-				'I'
nulu-		nulu-		niri-				'we'
kulub-	kultub-			orop-				'you f.'
kalab-	kaltab-			kerep-				'you m.'
ilib-				irip-				'you pl.'
ulu-	ulu-			oro-				'she'
ila-	ala-			ere-				'he'
ili-	ila-			iri-				'they'

* Note: /ni/ 'we exclusive'; /nib/ 'we inclusive'.

are few, the author's field notes indicate that it may not be quite so simple in Ninggirum (Division B). In all the languages examined in the Mountain-Ok Sub-Family the identification of verb stems is considerably hampered by the existence of two or more stems for many verbs. There, almost all verbs seem to have a stem marked for punctiliar aspect and one marked for continuative aspect. Some pairs of stems differ by their medial vowels and some differ by the presence of a special suffix in either the continuative or the punctiliar stem. In addition, almost all stems terminate with one of a small set of aspect suffix allomorphs, and for some pairs of stems this is the only difference between the continuative and punctiliar forms. A very few pairs of stems are completely different in their form (i.e. are suppletive). Some examples of punctiliar and continuative verb stems from five Mountain-Ok languages are listed below.

	Punctiliar Stems	Continuative Stems	Meaning
TL:	/bíkɾ́l-/	/bíkɾ́m-/	'pierce'
	/ɾ́fòl-/	/ɾ́fúm-/	'serve food'
	/bìkɾ́l-/	/bìkɾ́nám-/	'sew'
	/bókòl-/	/bákàm-/, /bákán-/	'say'
	/fúkùnól-/	/fúkún-/	'think'
	/dínèl-/	/dínánkál-/, /dínán-/	'fight'
	/tòòn-/	/tòònàm-/, /tòònàn-/	'sit'
	/dàál-/	/dàákàm-/, /dàákàn-/	'put'
	/ùndúl-/	/wèèm-/, /wàn-/	'prepare'
	/tàl-/, /tl̀-/	/télèm-/, /tálán-/	'come'
	/ùn-/, /nòò-/	/únèm-/, /únán-/	'go'[56]
TF:	/bokol-/	/bakaam-/	'say'
	/un-/	/unem-/, /unan-/	'go'
	/tel-/	/telem-/	'come'
	/taan-/	/taanyaam-/	'die'
	/utam-/	/utamyaam-/	'see it'
FA:	/bakaod-/	/bakaam-/, /bakan-/	'say'
	/utam-/	/utamaam-/	'see it'
	/dakad-/	/dakadam-/	'ask'
	/mod-/	/saan-/	'buy'
BM:	/bokor-/	/bakam-/	'say'
	/oko-/	/ukaa-/	'bathe'

	/un-/	/unem-/	'go'
	/toror-/	/taram-/	'wipe off'
MN:	/om-/	/pę-/	'say'
	/kan-/	/kanam-/	'die'
	/win-/	/unem-/	'go'
	/te-/	/terem-/	'come'

As well as containing a verbal root and one or two suffixes marking punctiliar or continuative aspect, some verb stems in Mountain-Ok languages also contain a prefix to indicate the person and number of the object. This latter feature also occurs in a few Kati verbs, but nothing can be said about its occurrence in Ninggirum at this stage. In each of these languages there is at least one set of five object prefixes which distinguish 'me', 'you sg.', 'him/it', 'her/it', 'us/you pl./them', and in many languages there are several similar sets of such prefixes. A few Teléfól verbs have a set of seven prefixes, the extra two being for 'them masc. non-human' and 'them fem. non-human'. In several of the languages some verbs have only two prefixes -- those distinguishing 'it masc.' and 'it fem.'. In Table 4 is a list of the object prefixes observed so far.[57]

The verb stem, which includes any object prefix, and for the Mountain-Ok languages some form of aspect marker, is normally suffixed to indicate the person and number of the subject in all Ok languages. These suffixes make six semantic distinctions: 'I', 'you sg.', 'he/it', 'she/it', 'we', and 'you pl./they'. Each language investigated has at least three sets of these suffixes as shown in Table 5, and these sets function to indicate tense as well as the subject person and number. Set A is used in a wide range of tenses, set B tends to have a past tense or continuative aspect significance in most languages, set C has an imperative, intentional or desiderative significance, and set D is used with "sentence-medial" or dependent verbs. For 'I' and 'he' Northern Kati dependent verbs indicate whether the subject of the next verb is the same as (/-iik/ 'I', /-eek/ 'he') or different from (/-aak/ 'I', /-ook/ 'he') that of the dependent verb. In Teléfól dependent verbs this is indicated for all persons by a suffix (/-n/ 'same subject' and /-s/, /-b/, /-k/ 'different subject') preceding the subject person and number suffix.[58] Southern Kati seems to make no such distinctions in its dependent verbs; there is almost no evidence available on dependent verbs in other languages.

Several Ok languages derive verb stems from nouns and adjectives by suffixation: TL /-an/, TF /-n/, FA /-an/. In several of the other languages a cognate of the same suffix seems to produce a derived adjective (or inconjugable verb?): KN /-an/, KM /-an/ ~ /-nan/, BM /-nam/, /-an/.

TABLE 4. OBJECT PREFIXES

	'me'	'you sg.'	'we/ they'	'him'	'her'	Typical Verb	Meaning
TL:	ni-	ka-	i-	a-	u-	-tam-	'see'
	na-	ka-	ya-	a-	wa-	-n#tokon-	'be angry with'
	na-	ka-	i-	du-	ku-	-fakal-	'harm'
	nam-	kam-	im-	dub-	kub-	-al-	'bury'
	namd-	kamd-	imd-	d-	k^w-	-eek#koom-	'burn'
				d-	k-	-ubka#eem-	'give him'
	namd-	kamd-	imd-	d-	k-	-ukam-	'take'
			Plural:	dul-	kul-		
TF:	ni-			a-	u-	-tam-	'see'
FA:	na-	ka-	i-	a-	wa-	-tamaam-	'see'
	nammeb-	kammeb-	immeb-	ade-	wade-	-faud-	'hold'
	namn-	kamn-	imn-	dub-	kub-	-am-	'hide'
BM:	nee-	ka-	ye-	a-	uu-	-tem-	'see'
	nam-	kam-	yam-	dab-	um- wom-	-ku kem-	'hide'
MN:	na-	ka-	ya-	a-	wa-	-temem-	'see'
	nem-	kem-	om-	dop-	do-	-wa-	'hide'
KM:	nee-	ee-	yee-	aa-	wee-	-ne-	'hit'
KN:	nee-	tee-	yee-	aa-	wee-	-ne-	'hit'

TABLE 5. SUBJECT SUFFIXES

Set	TL	TF	FA	BM	MN	....KM....		...KN...		NN	Meaning
A	-i	-i	-i	-i	-i	-an) -in)	-iin	-an) -in)	-aan	-æ) -i)	'I'
	-u	-u	-u	-u	-o	-un	-uun	-un	-uun	-u	'she'
	-a	-a	-a	-e	-e	-on	-een	-on	-oon	-a) -e)	'he'
	-ab	-ab	-ab	-eb	-ep	-eb	-eeb	-ep	-eep	-eb	'you sg.'
	-ub		-ub	-ub	-op) -up)	-ub	-uub	-up	-uup	-ub	'we'
	-ib	-ib	-ib	-ib	-ip	-ib	-iib	-ip	-iip	-ib	'you/they'
B	-ii		-ii	-ii	-i	-in	-yin	-iin	-ain	-aan	'I'
	-oo) -uu)		-uu	-uu	-o	-enun) -un)	-yun	-uun	-aon	-aun	'she'
	-ee	-ee	-ee	-ee	-e	-en	-yen	-een	-aan	-aan	'he'
	-alab		-eleb	-ereb	-ep	-eneb	-yeb	-eep	-aap	-ææb	'you sg.'
	-ulub		-ulub	-urub	-op	-enub	-yub	-uup	-aop	-aob	'we'
	-ilib		-ilib	-irib	-ip	-enib) -inib)	-yib	-iip	-aip	-aib	'you/they'

TABLE 5 (cont.)

Set	....TL....		TF	FA	BM	MN	KM	....KN....		NN	Meaning
C	-an	-oon		-i	-o	-an	-a	-a		-a	'I'
	-uk	-uuk	-uk	-uk	-uk	-ok	-uk	-uk		-uk	'she'
	-ak	-ook		-ak	-ok	-ek	-ok	-ok		-ɔk	'he'
	-al	-aal		-al	-a	-ar	-e	-e		-e	'you sg.'
	-um	-uum		-um	-um	-om) -um)	-em	-em		-em	'we'
	-in	-iin	-in	-in	-in	-in	-ami) -im)	-ime) -im)		-imi) -im)	'you/they'
D	-ili						-a	-ii	-iik) -aak)	-ik	'I'
	-ulu						-u	-uu	-uuk		'she'
	-ala		-ala				-o	-ee	-eek) -ook)		'he'
	-alab						-eb	-eep	-eep	-eb	'you sg.'
	-ulub						-ub	-uup	-uup	-ub	'we'
	-ilib						-ib	-iip	-iip	-i	'you/they'

In both Southern Kati and Northern Kati the subject markers are a second order set of suffixes; they may be preceded or followed by one of several tense and aspect suffixes. The first order suffixes seen in Drabbé's material are: KM /-an/ future, /-emee/ habitual; KN /-an/ future, 'must', /-emee/ habitual, /-aay/, /-aan/ future negative, prohibition. The third order suffixes are: KM /-en/, /-in/ perfect, /-yen/, /-yin/ pluperfect, /-ket/ dependent verb, optative; KN /-en/ perfect, /-et/, /-a/ dependent verb. KN also has a prefix /ma-/ with the meaning 'try'. In Southern Kati verbs without a tense suffix are present tense with set A subject suffixes and mid past with set B subject suffixes. In Northern Kati verbs without a tense suffix are ambiguously past or present tense with both set A and set B subject suffixes. The author's material on Ninggirum verb forms is insufficient to show the tense markers clearly, but it appears that suffixes /-ten/ and /-tye/ may follow the subject markers and prefixes /ma-/ and /ka-/ precede the stem. The meanings of these have not yet been established, nor is it yet possible to say whether or not there are any tense or aspect suffixes that precede the subject markers.

In all Mountain-Ok languages examined the subject markers are second or third order suffixes. For the languages in which they are third order suffixes, there is just one second order suffix in the position preceding them: TL /-al/, BM /-ar/ negative. For all Mountain-Ok languages the first order suffixes indicate tense and aspect. The suffixes identified so far include the following:

TL: /-b/ present (continuative), near past (punctiliar), /-antem/ future, /-s/ far past, /-nam/ ability, /-mans/ yesterday past, /-nub/ habitual, and the phonologically free forms /#bom/ habitual, /#nakb/ recent habitual, /#bontem/ tomorrow future, and lack of tense suffix signifies a neutral tense which usually functions as an immediate past in the punctiliar aspect and as a future or customary in the continuative aspect.

TF: /-s/ past, the punctiliar without a tense suffix functions as a near past and as a completive, and the continuative without a tense suffix functions as a future, and especially so when the auxiliary verb stem /ko-/ is also used.

FA: /-ookab/ future, /-b/ present (continuative), /-s/ past, /-uub/ past habitual, and punctiliar without tense suffix signifies a near past.

BM: /-ok/ future, /-b/ present (continuative), /-s/ past, /-kaabb/ habitual, /-om/ desiderative, and punctiliar without a tense suffix is completive.

MN: /-ap/, /-amap/, /-omap/ future, /-p/ present (continuative), near past (punctiliar), /-s/, /-pin/ past, and the punctiliar without a tense suffix signifies past time.

All of these five languages also have a few verbal suffixes which occur as the sole suffix (i.e. with no accompanying subject suffix). For example, TL, TF, FA, BM, MN /-in/ is customary or infinitive, and when followed by a negative particle this form signifies negative customary or prohibition.

There is some evidence that the Mountain-Ok languages have a wider range of dependent verb forms than Drabbé describes for Southern Kati and Northern Kati. For example, in Teléfól the subject suffix is third order, preceding it is a marker of "same subject" or "different subject" in second order as listed above, and preceding this may come any one of a set of first order suffixes indicating the temporal or logical relationship between the action of this and the following verbs. E.g. /-bi/ 'while repeatedly', /-bom/ 'while', /-sit/ 'soon after commencing', /-som/ 'while', 'both ... and'.

All Ok languages for which data are available have a similar way of forming what might be called benefactive verbs, and this is applicable to almost all verb stems.[59] The general order of morphemes in benefactive verbs is: (a) verb stem, including object prefix, if any, (b) benefactive marker, in some languages, (c) marker of beneficiary person and number, (d) aspect marker, in Mountain-Ok languages, (e) tense, negation, aspect, and subject markers of the same variety and in the same order as occur suffixed to non-benefactive verbs. For some languages, such as Teléfól, this sequence may be thought of as two (grammatical) words, (a) and (b) constituting a participle, and (c), (d) and (e) constituting a benefactive auxiliary verb, with (c) and (d) as its stem. Drabbé calls (a) the primary stem and (a) + (c) the secondary stem in Kati (where (b) and (d) seem not to occur).[60] For example, TL /bòkoòb#néèlàntémá/ 'he will tell me' consists of (a) /bòkoò/ 'say' punctiliar, (b) /-b/ benefactive punctiliar, (c) /#néè/ 'me', (d) /-l/ punctiliar, (e) /-àntémá/ 'he will'.

In both position and meaning, the beneficiary markers closely parallel object prefixes. In Southern Kati, Northern Kati, and Mianmin, these show the same five distinctions of person and number as the object prefixes, in Bimin and Tifal the same seems to be true, but in Teléfól only three distinctions are maintained: 'me' and 'you sg.' versus all other persons. The beneficiary markers observed so far are listed below:

Language	'me'	'you sg.'	'we/they'	'him'	'her'
TL	#néè	#kéè	#éè	.....	
TF	-n		-y	-l	-w
BM	-ne	-ke		-re	-u
MN	-ne	-ke	-ye, -e	-are, -ha, -a	-ure, -we, -o
KM	—	-md	-my	-md, -nd	-mk
KN	-w	-pt	-nd	-n	-mp

Ninggirum and Angkiakmin also seem to have benefactive forms but detailed information is not available.

The beneficiary in the Ok verbal forms described above occasionally corresponds to an English subject (TL /dàál tèbeéb# éèlú/ 'he is tired', literally 'tiredness has overcome him'), sometimes it corresponds to an English object (TL /òòlaàb# éèlú/ 'she called him'), it corresponds to an English indirect object introduced by to for a few verbs (TL /dóób# éèlú/ 'she gave it to him'); but in the majority of verbs it corresponds to an English indirect object introduced by for (TL /fùùb# éèlú/ 'she cooked it for him').[61]

2.7 SYNTAX

The statements of syntactic features presented below are based upon KN, MN, TL, TF, and BM; what little information there is concerning KM and FA syntax is consistent with these statements.

In noun phrases in the Ok languages most adjectives follow the noun they qualify. Numerals usually follow adjectives, and any associated pronoun (usually third person) comes last of all. A possessor, consisting of a pronoun, noun, or noun phrase, precedes the noun possessed. E.g. TL /nímí kòòŋ kàtìb áloòb úyoó/ 'my two little pigs' (my pig little two she/it).

Coordination of nouns or noun phrases is usually marked by the occurrence of a postclitic or particle following each coordinated item. E.g. KN /om a, kuk a, atom a/ 'sago palms, areca palms, and coconut palms'. Such coordinating morphemes include: KN /a/, KM /a/, TL /àà/, /èè/, /mín/, /sòó/, TF /soo/, FA /soo/, BM /soo/, MN /a/ ~ /ya/. These all mean 'and', and in some circumstances, 'or'.

The most noteworthy type of verb phrase in the Ok languages consists of an adjunct plus one of a small sub-class of verbs. Some adjuncts are clearly nouns or adjectives, while others occur only in this type of construction. Several of the verbs also occur without an adjunct, but some are limited to occurring in this construction. The adjunct-verb combination is in fact an idiom whose meaning cannot be predicted from any meanings that the adjunct and verb may have in other contexts. E.g. TL /ísál/ 'above', /dákàmìn/ 'take', /ísál dákàmìn/ 'climb tree to hunt possums'.

Several kinds of clause may be identified in the Ok languages, some of which are listed below:

Complementary:	± Subject	+	Complement	±	Copula
Motion:	± Subject	±	Destination	+	Motion
Intransitive:	± Subject	±	Location	+	Intransitive Action

Transitive: ± Subject ± Location ± Object + Trans. Action

Transitive Benefactive:[62] ± Subj. ± Loc. ± Beneficiary ± Obj. + T.B. Action

The subject, object, beneficiary, and destination usually consist of a pronoun, noun, or noun phrase. The complement may be either a noun, noun phrase, or adjective. The location unit usually contains one of a set of positional morphemes postposed to a noun in what may be considered a possessive construction. These "postpositions" are actually nouns, although, of course, they are translated by English prepositions.[63] In addition, a location unit usually terminates with a characteristic locative marker that might be said to mean 'at'. E.g. TL /mèén-tèèm kàl/ 'in the bag' (bag in at). The locative markers observed so far are: KN, KM /yaa/, TL /kal/, BM /ker/, TF /kawo/. Almost always the verb (copula, action, or motion) is marked for subject person and number, and in Transitive Benefactive Action the verb is marked for the beneficiary person also. Each language has three or four verbs with the general meaning 'be' or 'become' which occur as copula. The time unit is not shown in the formulae above as its position of occurrence is very flexible. Its most preferred positions are preceding the subject and preceding the final verb, but it seems that it may occur anywhere except in clause-final position.

All Ok languages seem to have several different connectives to link clauses together. Sequences of clauses also often occur without a connective, the first clause being clearly marked as dependent upon (subordinate to) the second one by the "medial" form of its verb. Sentences may be terminated by negative, interrogative, and affirmative (declarative, indicative) particles, as well as several others. In Kati both a negative verbal suffix and a negative sentence-terminal particle may occur in the same sentence; in Teléfól either one or the other occurs depending on the tense of the verb. Some of the sentence-terminals observed so far are listed below.

	KN	KM	NN	TL	TF	FA	BM	MN
negatives		bain	ben	ba	da	ba	ba	pa
	parin	badin	bidim	binim	dinim	binim		pirim
interrogatives	o	o, a		a~ya		a~ya	a~ya	e~ne
				aka	yako	aka	e	a, so
affirmatives		te		koo, $k^{w}a$	koo	ka	ka	pe

2.8 LEXICOSTATISTICS

In Table 6 a sample of fifty words is given for each of 24 dialects and languages of the Ok Family and for 4 other languages which show some lexical similarity to the Ok Family. In Table 7 a further seventy words are listed for a representative selection of these languages. Each word listed is the commonest one in use for that particular meaning, where this could be ascertained; in other cases the first word proffered by the informant is listed. All the Ok material, both from published and unpublished sources, has been tentatively phonemicized in accordance with the phonemic descriptions presented in sections 2.1 to 2.4 (see especially Tables 1 and 2).

Preceding each word in Tables 6 and 7 is a number representing the particular set of tentatively identified cognates to which that word belongs. For any particular meaning (that is, for the words in any one column), those words which have the same number are deemed to be cognates.[64] Zero represents lack of information at any point. By recording all of one's cognate decisions in this way before lexicostatistical counting is undertaken, one avoids the danger of making inconsistent decisions that is inherent in the method which remakes such decisions as each pair of languages is compared and counted. Also, once so recorded, the decisions are amenable to counting by a computer.

In making the decision as to whether a particular pair of words are cognate or not the author applied a standard which he felt to be commensurate with the reliability of the data under examination. Since only one-third of the word lists have been checked in the field in any way, it is neither possible nor reasonable to insist upon the rigorous identification of regular sound correspondences for each phoneme in a pair of words before they are reckoned as cognates. For the same reasons, along with the consequently tentative nature of the sound correspondences that have been isolated, it has not been possible to identify loan words with any certainty.

Two words of the same meaning in two languages are here regarded as cognates if their phonemes are matched and accounted for pair by pair in the following way:

(a) Most (80% for instance) of their phoneme pairs involve sound correspondences already established (by at least three examples) for the two languages or their dialects.

(b) The remaining phoneme pairs are plausible correspondences. That is, such correspondences are either observed in other Ok languages or are well known in comparative linguistics. Or alternatively, the remaining phoneme pairs may be identified as established correspondences by assuming a plausible error of hearing on the part of the person who recorded the word list.

TABLE 6. WORD LISTS AND COGNATE DECISIONS

English Dutch	head hoofd	hair hoofdhaar	ear oor	eye oog
NS	5 0 abol	2 0 kamil	1 siloŋ	3? 0 silokop
TA	1 dabom	1 dabom kon	1 tloŋ kal	1 tin
TF	1 dàboòm	1 dàboòm koòn	1 tílaáŋaàl	1 tiìn
TW	1 dabom	1 dabom kon	1 tidoŋ	1 kin
KW	2 guu	2 guu kalim	1 kedoŋ kaal	1 kiin
FI	1 debom	1 dukon	1 tudan kal	1 kin
FG	1 gaboom	1 gaboom koon	2 kaluun	1 kiin
FP	1 gabom	1 gabom kon	2 kidum kaal	1 kiin
FA	1 guboom	1 guboom koon	2 kaluun	1 kiin
FW	1 gibom kun	1 gibom kon	2 kalun	1 kin
FS	1 ubom kun	1 ubom kon	2 karum kar	1 kin
BM	3 kaak	1 kaak on	2 karuun	1 kiin
BK	3 kakun	1 kakon	2 karun	1 kin
TL	1 dùboóm	1 dùboóm kòón	2 tùluún káàl	1 tiìn
MN	1 gapam	1 gapam an	2 koron	1 kin
WG	1 kuwomo	1 kawomano	2 kadanote	1 kino
KD	4 kotdook	3 ambokimo	3 keembee	2 konyoob
KM	4 kotodok	3 ambo kimi	4 kende	2 konyob
YM	4 kododok	4 awuŋ	4 kenoot	3 indob
KA	4 kotorok	5 ambo tubuŋ	4 kerekot	3 tinob
KN	4 kotorok	5 ampo topuŋ	4 kenekot	3 tinop
NN	5 awoo kadɔɔ	6 awo haum	4 ke hoou	3 kioob
NK	5 awu kalaa	7 awu hoo	4 keekoᵘ	3 kiob
UT	5 aboo	7 abo hol	4 keda hol	3 kilob
OB	3 kaak	8 kaakbat	5 naad	1 kiin
DK	6 kenbian	9 mögö-ron	4 keretop	3 kerop
DW	7 ŋgin	9 ŋgi-ron	6 turutop	3 kerop
GL	0	5 -otoŋ	7 omola	1 atsiŋ

TABLE 6 (cont.)

English	nose	mouth	tongue	tooth
Dutch	neus	mond	tong	tand
NS	1 ą misol	58 aŋo 1 bon	1 ą apioŋ	3 ą niŋil
TA	1 matum kun	1 bontem	1 falaŋ	1 sit
TF	1 mútúm (kùn)	1 boón teém	1 fíláŋ	2 kiíl
TW	1 mutum	1 bontem	1 filaŋ	2 kail
KW	1 mutu	1 boonteem	1 falaŋ	2 kail
FI	1 mutum	1 bontem	1 falaŋ	2 kàil
FG	1 mit	1 boonteem	1 falaŋ	2 kail
FF	1 mituum	1 bontem	1 flaŋ	2 kail (kun)
FA	1 mutuum	1 boon teem	1 falaŋ	2 kail
FW	1 mitum kun	1 bon tem	1 felaŋ	2 kail
FS	0	1 bontem	1 faroŋ	2 kair
BM	1 mutuum	1 boonteem	2 fooŋ	3 niiŋ
BK	1 mutum	1 bontem	2 foŋ	3 niŋ
TL	1 mítuím kín	1 bòón tèém	2 fòóŋ	1 sít kún
MN	3 mumuŋ	2 anaŋ	2 haŋ	1 sit (on)
WG	4 kapiote	3 iyadote	2 hanote	1 sitote
KD	5 kidiŋ kondo	4 moŋateem	2 oŋ	0
KM	5 kidiŋ kondo	4 moŋkot tem	2 oŋ	3 niyì kondo
YM	5 kidiŋ kono	4 moŋkot tem	2 ooŋ	7 niŋambo
KA	5 kini ŋkono	4 moŋkotem	2 hoŋ	7 niŋambo
KN	5 kiniŋ kono	4 moŋkot tem	2 oŋ	7 niŋkampo
NN	6 gaukoo	5 miŋatem	2 hoŋ	3 niŋi koo
NK	6 gaok	6 meaa tem	2 hooŋ	3 niŋii
UT	1 midu	6 miyakad	2 hoŋ	3 niŋilob
OB	7 adum	7 adem	2 paaŋ	?4 gaa
DK	8 toŋgut	4 maŋgot	3 oŋgat	5 imban
DW	2 ambotop	4 maŋgot	4 anop	6 inim
GL	9 us	0	5 siaalum	1 tsi

TABLE 6 (cont.)

English / Dutch	back-of-neck / nek	breast / borst, (uier)	back / rug	foot / voet
NS	11 ɑ kuni ?	1 ɑ mug	1 ɑ ol kuisi	1 ɑ yon silbil
TA	1 ditek	1 muk	1 ol kun	1 yaan
TF	1 dìtàk (kun)	1 muúk	1 ool kun	1 yaan
TW	1 getek	1 muk	1 olkun	1 yan
KW	1 getak	1 muuk	2 daaŋ	1 yaan
FI	1 gitak	1 muk	2 dan kun	1 yan
FG	1 getak	1 muuk	2 daaŋ kun	1 yaan
FF	1 gitak kun	1 muk	2 daaŋ kun	1 yaan
FA	1 getak	1 muuk	2 daaŋ	1 yaan
FW	1 getak kun	1 muk	2 daŋ kun	1 yan
FS	2 oru kun	1 muk	3 mur kun	2 kabmur
BM	(1) ratak (kun)	2 noon	3 muur	1 yaan
BK	3 g^wer	2 noŋ	4 kinkun	1 yan
TL	(1) dìtàk kún	1 mùúk	2 dàáŋduúŋ	1 yààn
MN	4 mukon	1 moi	2 rąŋ on	3 sikir on
WG	1 katete	3 kipote	5 tompia	3 sikidote
KD	1 keetee kondo	1 mu	6 aŋitom	4 kondo-tabundu
KM	1 ketek-kondo	1 muk	6 aŋkitom	4 kondo
YM	1 ketik kono	1 muk	0	1 yon(dat)
KA	1 ketekono	1 muk	6 aŋkakutom kono	1 yon
KN	1 ketek kono	1 muk	6 aŋkutom	1 yon
NN	5 gomgobkim	1 muk	7 menkab	1 don
NK	6 koub kim	1 muk	7 mimkaab	1 lon
UT	7 woŋidu	1 muk	7 mimkubi	1 lon
OB	8 manbi	(2) noon	? 8 koo(m)	? 5 tooŋ
DK	9 ŋgemben	4 an	9 mbüman	4 kondok
DW	10 awut-mit	4 om	10 mimit	4 kondok
GL	0	5 mum	0	1 yan

TABLE 6 (cont.)

English	knee	hand	bone	blood	skin
Dutch	knie	hand	been,knook	bloed	huid, vel
NS	7 ɓ bayup	8 etul silbil	1? ɓ kulol	6 ɓ yapi	2 ɓ kal
TA	1 tli kun	1 sikil	1 kun	1 takot	1 ibnal
TF	1 tilik	1 sìkìil	1 kun	2 ileem	1 ibnaal
TW	1 tedikun	1 sakil	1 kun	2 ilim	2 kal
KW	1 tadik	2 teŋ	1 kun	3 kaim	2 kaal
FI	2 katul	1 sakil	1 kun	4 kalìm	2 kal
FG	2 katuun	1 sikaal	1 kun	3 kaim	2 kaal
FF	2 katuum kun	2 teŋ	1 kun	3 kaem	2 kaal
FA	2 katuun	2 teŋ	1 kun	3 kaim	2 kaal
FW	2 katin	2 taiŋ	1 kun	3 kaim	2 kal
FS	2 katin	2 taiŋ	1 kun	3 kaim	2 kaar
BM	2 katin	2 taiŋ	1 kuum	3 kaim	2 kaar
BK	2 katin	2 teŋ	1 kun	3 kaim	2 kar
TL	2 kátuùn (kún)	1 sàkaál	1 kún	5 ìsák	2 kàal
MN	3 roroŋ	3 koiron	1 on	2 irom	2 ɛl
WG	3 didono	3 kodiate	1 onote	2 idemote	2 adote
KD	4 kondo-tom	4 ben tabudu	1 kondo	6 yab	2 abkad
KM	4 kondo tom	4 ben	1 kondo	2 yan	2 kat
YM	5 taŋbo	2 tiŋgi	1 kono	7 umkan	2 kat
KA	6 kono	2 tini	1 kono	2 yam	2 kat
KN	10 kaŋtom	2 tiniŋ kuŋ	1 ka kono	8 momkon	2 kat
NN	7 toon buŋab	2 tani	1 kwoo	2 daam	2 kaa
NK	7 buŋub	2 tani	1 kwoo	2 lam	2 kaa
UT	7 buŋub	2 teŋiŋuŋ	1 kodo	9 heek	2 kad
OB	2 katin	5 haantam	?2 taum	3 kaim	3 watag
DK	8 wambüon	6 it	3 mirap	10 ŋgom	2 kota
DW	9 kondok kerop	6 wit	4 mit	10 ŋgom	2 kotae
GL	11 dyambri	7 atee	5 yam	0	0

TABLE 6 (cont.)

English Dutch	fat (n.) vet (sb.)	man man	woman vrouw	child kind	house huis
NS	2 Ø maiek	1 kaka	1 wenaŋ	1 tena	3 Ø aip
TA	1 tukul	2 tanum	1 unaŋ	2 man	1 am
TF	2 matak	2 tinum	1 unaŋ	2 man	1 am
TW	2 matak	2 tinum	1 wanaŋ	2 man	1 am
KW	1 tukul	2 kinum	1 unaŋ	2 man	1 am
FI	2 matak	2 kinum	1 wanaŋ	2 man	0
FG	1 tukul	2 kinum	1 wanaŋ	2 man	1 am
FF	1 tukul	2 kinum	1 wanaŋ	2 man	1 am
FA	1 tukul	2 kinim	1 wenaŋ	3 miin	1 am
FW	1 tukul	2 kinim	1 wanaŋ	2 mun	1 am
FS	1 tukur	2 kinum	1 wanaŋ	1 ten (nerner)	1 am
BM	1 tukgur	2 kunum	1 waneŋ	3 min	1 am
BK	5 kaintur	2 kunun	1 waneŋ	0	0
TL	1 túkúl	2 tànúm	1 ùnáŋ	2 mán	1 àm
MN	2 matak	3 naka	1 unaŋ	2 men	1 am
WG	2 mitekote	3 nikaite	1 wunanite	4 kuemite	1 amote
KD	3 kob	4 katuk	2 kon	1 tana	2 ambib
KM	3 kob	5 kambatim	2 kon	2 mun	2 ambib
YM	0	4 kndub	1 wonoŋ	1 (nen) tana	2 ambib
KA	3 kob	4 katub	1 woroŋ	1 tana	2 ambib
KN	3 kop	4 katuk	1 wonoŋ	1 tana	2 ampip
NN	5 tuu	4 kadub	2 kwon	1 tana	1 ɑm
NK	5 tuu	1 ka	2 kwon	1 tena	1 aam
UT	5 tuul	1 kaa	2 koon	1 tina	1 aam
OB	? 4 (hu)	7 haan	? 3 kuu()	5 baded	3 aap
DK	1 tögö	8 kilap	4 ran	2 mun	4 mbutip
DW	1 tugui	6 kagup	4 ran	2 mun	4 mbitip
GL	0	0	0	6 biiye	5 aaye

TABLE 6 (cont.)

English	fire	fish	sago	sugar-cane	sweet-potato
Dutch	vuur	vis	sago	suikerriet	zoete bataat
NS	9 ayol	10 aniŋ	10 omser	1 kit	1 boneŋ
TA	1 as	1 aniŋ	1 wom	1 kit	2 wan
TF	1 as	1 àniìŋ	1 oom	1 kiit	2 waán
TW	2 weŋ/wieŋ	1 aniŋ	0	1 knit	0
KW	2 waiŋ	2 takam	1 oom	1 k^{W}eet	2 waan
PI	1 as dawoŋ	0	0	0	0
FG	2 waiŋ	2 takkam	1 om	1 k^{W}eit	2 waan
FF	1 as	2 takam	1 om	1 k^{W}ait	3 tadeŋ
FA	1 as	2 takam	1 woom	1 k^{W}eit	2 waan
FW	1 as	2 takam	1 wom	1 k^{W}ait	2 wan
FS	1 ais	1 aaniŋ	1 om	1 k^{W}ait	2 wan
BM	1 ais	3 firigib	1 om	2 mokor	4 saur
BK	2 weŋrom	0	0	0	0
TL	1 àt	1 ániìŋ	1 òòm	1 k^{W}èét	2 wàán
MN	1 as	1 aniŋ	2 mifim	1 k^{W}ait	2 wan
WG	1 asiete	1 aninite	2 meimo	1 kototo	5 sidipuete
KD	3 amo	4 on	1 om	3 abo	2 wan
KM	3 amo	4 on	1 om	4 uun	6 ombodob
YM	3 amot	4 on	1 om	5 abit	1 boteŋ
KA	3 amot	4 ton	0	5 habwik	0
KN	3 amot	4 ton	1 om	5 awit	1 ponreŋ
NN	4 awob	4 tyon	1 ọm	1 kwit	1 bodeŋ
NK	4 awob	4 tyon	1 om	1 kwit	1 boleŋ
UT	1 asat	5 bak	1 om	1 kuwit	1 boneŋ
OB	5 idaat	1 aniŋ	3 gaaku	1 k^{W}ait	7 tugan
DK	6 in	6 rogoa	4 ndu	6 kŭm	6 tombŏrop
DW	7 enop-tenop	6 ragae	4 ndun	7 kin	1 mbondeŋ
GL	8 uke	0	0	0	0

TABLE 6 (cont.)

English Dutch	taro keladi, tales	banana banaan	tree boom	leaf blad	domestic pig varken
NS	1 om	{2? yop 1 tom	1 ɑ	1 ɑ akon	1 kaŋ
TA	2 ima	1 sum	1 as	1 kon	1 kaŋ
TF	2 ima	1 suum	1 as	1 as koon	1 kaŋ
TW	2 yama(n)	1 sum	1 as	1 as kon	1 kaŋ
KW	2 yaman	1 suum	1 as	1 as koon	1 kooŋ
FI	0	1 sum	1 as	1 kon	0
FG	2 iman	1 sum	1 as	1 askoon	1 koŋ
FF	2 iman	1 suum	1 as	1 k^{w}on	1 kuŋ
FA	2 iman	1 suum	1 as	1 as koon	1 kuŋ
FW	2 iman	2 aub	1 ais	1 ais kon	1 koŋ
FS	2 imen	1 suum	1 ais	1 ais kon	1 k^{w}oŋ
BM	2 yemen	1 sum	1 ais	1 ais koon	1 kaiŋ
BK	0	0	1 ais	1 ais kon	1 kaiŋ
TL	2 ímán	1 sùùm	1 àt	1 (àt) kòón	1 kòòŋ
MN	2 imen	1 som	1 as	1 (as) an	2 eil ami
WG	2 imenote	1 somnte	1 aso	2 tikote	2 edo
KD	2 yemen	1 yum	2 ab	3 ab-o	3 abon
KM	2 yemen	1 yum	1 at	3 oo	3 amoŋ kob
YM	2 yemen	1 yum	1 at	4 awutok	3 awon
KA	2 yemen	1 yum	1 hat	4 awotkok	3 hawona
KN	2 yemen	1 yum	1 at	3 ot	3 awon
NN	2 namen	1 dum	1 a	3 a hoo	1 kwaŋ
NK	2 lamen	1 dyum	1 a	3 a hoo	1 kwaŋ
UT	2 iniman	1 dyum	1 a	1 a kon	4 tamen
OB	3 paa	3 magaab	3 idaat	5 idatdin	5 imaag
DK	4 irandöp	4 tetkei	4 in	6 ron	6 u
DW	5 wirop	5 tit	5 enop	6 ron	6 ui
GL	2 aami	0	6 tyam	0	7 uduk

TABLE 6 (cont.)

English Dutch	dog hond	tail staart	cassowary casuaris	bird vogel
NS	1 kayam	4 ebil	11 dubol	4 nal
TA	1 kayam	1 womsan	1 kumsob	1 awon
TF	1 kayaam	1 wàmsàn	1 kumsoob	1 awoon
TW	1 kayam	1 wamsan	1 kumsob	1 awon
KW	2 mayaan	1 waimsan	2 bia	1 uun
FI	2 miyan	1 wemsan	1 kumsob	1 awon
FG	2 mayan	2 weim	1 kumsob	1 awon
FF	2 mayaan	1 waimsun	2 bia	1 awon
FA	3 maan	2 wem	2 bia	1 awoon
FW	3 man	2 wem	2 bia	1 aon
FS	3 man	3 makom kun	2 bia	1 aon
BM	2 miyan	3 moŋom	2 bia	1 aon
BK	2 mian	0	2 bia	1 awon
TL	1 kàyaàm	1 úmsán	1 kúmsoób ?	1 úùn
MN	4 til	1 unsan	3 kopor	1 wan
WG	4 tiado	1 wisenote	3 kapadote	1 wanite
KD	5 anom	4 imbi-kondo	4 diab	1 on
KM	5 anon	4 yimbi-kondo	4 diab	2 akumbi-on
YM	6 an	0	4 diab	3 ayadi on
KA	5 hanon	4 hon yibi kono	5 baniyab	1 hon
KN	5 anon	4 yipi kono	5 panaap	1 on
NN	7 niŋob	5 umko	6 biangadob	1 on
NK	7 neoob	5 uumkwoo	6 biakalob	1 on
UT	7 niŋob	6 wabi	2 byaa	1 (h)oon
OB	2 mian	2 waim	7 nedsuup	4 need
DK	8 aŋga	6 wombiit	8 mbaeŋgap	5 et
DW	8 aŋgae	6 wambit	9 itit	5 yet
GL	0	7 -otoŋ	10 dabuniŋ	6 mai

TABLE 6 (cont.)

English Dutch	egg ei	string bag (draag)net	head louse luis	snake slang	sun zon
NS	6 nal amil	1 mem, men 2/3	2 sip	1 awot(semitki)	5 sar
TA	1 win	1 men	1 tim	2 inab	1 atan
TF	1 win	1 meén	1 tim	2 inab	1 átán
TW	1 auwan win	1 men	1 kim	2 inab	0
KW	1 win	1 meen	1 kim	2 inab	1 ataan
FI	1 awan win	1 men	1 kim	0	1 atan
FG	1 win	1 meen	1 kim	2 inab	1 ataan
FF	1 win	1 men	2 tibub	3 faim kun	1 ataan
FA	1 win	1 meen	1 kim	3 faim kun	1 ataan
FW	1 win	1 men	1 kim	3 faim kun	1 atan
FS	1 win	1 men	1 kim	3 faim kun	1 atan
BM	1 win	1 meen	1 kim	4 sukayan	1 atan
BK	1 aon gin	0	1 kim	0	1 atan
TL	2 úùn màkáb	1 mèén	1 tìm	2 ìnáb	1 átaán
MN	1 win, un	1 men	1 go-kim	2 inap	2 afok
WG	1 wan wino	1 menote	1 kokimite	2 inapite	5/1 sano
KD	0	0	1 im	2 anùb	1 aton
KM	1 windi	1 meen	1 im	2 anyuk	1 aton
YM	1 wini	1 men	1 um	5 niin	1 aadon
KA	1 wini	1 men	1 tim	5 nin	1 aton
KN	1 wini	1 men	1 tim	5 niin	1 aton
NN	1 on-i	1 men	1 kwim	2 inub	1 adon
NK	1 ii	1 men	1 kwim	2 inub	1 aloon
UT	1 oonidi	1 men	1 kwim	2 inub	1 adon
OB	3 nedgwe	2 uŋ	3 kaaksup	6 puum	1 atan
DK	4 wendin	3 mbeŋgiat	4 ŋgut	7 ŋgweti	3 teet
DW	5 wagot	4 ok kit	4 ŋgut	8 aŋgun	4 sat
GL	0	0	0	0	0

TABLE 6 (cont.)

English	moon	ground	rain	wind	water
Dutch	maan	grond	regen	wind	water
NS	6 ukol	11/8 magol	8 amok	8 aplum	1 ok
TA	1 kayob	1 tuwaal	1 om	1 dlul	1 ok
TF	1 kàyoòb	1 tawaal	1 woom	2 inim	1 (w)oòk
TW	1 kayob	1 tawal	1 wom	2 inim	1 wok
KW	1 kayoob	1 tawaal	2 waib	2 inim	1 ook
FI	1 kayob	2 kafin	2 weib	2 inim	1 wok
FG	1 kayob	2 kafin	2 waib	1 gaduul	1 ok
FF	1 kayob	3 bakan	2 waib	1 gadul	1 wok
FA	1 kayoob	3 bakan	2 waib	1 gaduul	1 wok
FW	1 kaiyob	1 tawal	2 weib	2 inim	1 wok
FS	1 kaiyob	1 tawar	2 weib	1 narur	1 wok
BM	1 kayoob	1 tawar	3 suuk	2 inim	1 ook
BK	1 kaiyob	0	3 suk	0	1 ok
TL	1 káyoób	2 kàfín	2 wèéb	1 dùlúl	1 òòk
MN	2 arim	4 rapar	3 sok	1 goror	1 a(i)
WG	3 yipikaliete	4 lipalote	3 soko	1 kalodote	1 aiyo
KD	4 wod	5 ambikin	1 am	3 owadim	1 ok
KM	4 woot	6 okat	1 am	3 uwadim	1 ok
YM	4 woot	7 badab	4 amdom	8 nub	1 ok
KA	4 wot	7 batab	1 am	5 hamot	1 hok
KN	4 woot	7 patap	1 am	4 am uup	1 ok
NN	4 woo	7 badaab	5 wae	4 huub	1 ok
NK	4 woo	7 balaab	5 wai	6 abi	1 ok
UT	1 kayob	7 bidab	5 wali	4 huub	1 ok
OB	1 kaiyop	8 moog	6 toom	2 inim	2 tom ?
DK	5 ogo	9 itiwa	7 murup	7 kiou	1 ok
DW	5 wogoi	10 itop	7 mirip	7 kiwui	1 ok
GL	0	0	0	0	3 meye

TABLE 6 (cont.)

English	mountain	stone	path	small
Dutch	berg	steen	pad, weg	klein
NS	10 abenoŋ sigin	1 tum	8 Wol	1 yambul
TA	1 amdu	1 tuum	1 iib	2 katib
TF	1 amdu	1 tuúm	1 liìb	2 katib
TW	1 amgu	1 tum	1 lib	2 katib
KW	1 amgu	1 tuum	1 laib	2 katib
FI	1 amdu	1 tum	1 leib	2 katib
FG	1 amgu	1 tuum	1 laib	2 katib
FF	1 amgu	1 tuum	1 laib	2 katib
FA	1 amgu	1 tuum	1 leib	3 neenon
FW	1 amgu	1 tum	1 laib	4 nen nag
FS	1 amu	1 tum	1 reib	5 nerner
BM	1 amgu tikin	1 tuum	1 raib	6 ger
BK	0	1 tum	1 raib	6 gerger
TL	1 àmdù	1 tùúm	1 ìleéb	2 kàtíb(noók)
MN	2 amgorim	1 tom	1 reip	7 men
WG	3 pedote	1 tomote	1 lepute	8 kuamote
KD	0	2 bot	2 kim	9 bedon
KM	4 am kombon	2 bot	2 kim	10 banyiŋkaab
YM	5 koot bon	2 bot	3 kiwan	0
KA	5 kot bon	2 bot	3 kiwan	11 boŋti
KN	6 anoŋ	2 pot	3 kiwan	11 poŋti
NN	7 amkwon haab	2 bo	4 wem	12 badikbɔ
NK	7 amkol haab	2 boo	4 waim	12 belekbo
UT	1 amŋu	1 tuum	5 waibmo	13 badobtet
OB	8 yai	3 kwii	6 mandap ?	14 gadapok
DK	9 mburindtn	4 iwan	0	9 mberon
DW	2 amgon	5 irop	0	9 mberon
GL	0	6 waaliŋ	7 atyaa	0

TABLE 7. WORD LISTS AND COGNATE DECISIONS

English	heart	belly	liver	shoulder blade
Dutch	hart	buik	lever	schouderblad
NS	7 seepu	9 kumdul	5 ŋil	1 mak
TF	1 akeet	1 mat	1 (y)in	2 oom kun
FA	2 dumnoob	1 mat	2 tukaan	3 mayaak
BM	3 iborob	2 kumun	3 wam	3 mayak kun
TL	4 búbúl	1 mát	1 ín	1 mààk kún
MN	4 popor	3 àl	1 ín	1 mak on
WG	5 winote	3 alo	4 nadidote	0
KD	6 bibiob	4 ambon	0	0
KM	2 dimyob	5 kamba yob	1 anyi	0
KN	6 mimyop	5 kapa	1 ini	0
NN	2 dimtob	6 kuwaa	1 woo-ni	1 tani mak
OB	4 babod	7 abda	3 oom	4 badtam *of wing TL bal*
DK	2 ndümarop	8 wendin	2 ndugon	0
DW	2 ndimndop	8 wandin	3 ahum	0
GL	0	2 mune	0	0

English	eat	drink	bite
Dutch	eten	drinken	bijten
NS	1 ~~namnam~~ en-	1 en-	10 ikiqar
TF	1 inin	1 ook inin	1 kiil bakelmin
FA	1 wanin	1 wok wanumoo	2 anu wokodu waniu
BM	1 wanee	1 ook wanee	0
TL	1 únáŋkálìn	1 òòk únáŋkálìn	3 sít kú fákaá kúkàmìn
MN	1 unarin	1 unarin	4 rotama haro
WG	2 yuwimpelpe weampo	2 aiyuwempepade	0
KD	3 kana	3 ok-kaminib-kana	5 tomondom
KM	1 anye-	1 anye-	5 tomonde-
KN	1 ane-	1 ane-	5 tomone-
NN	1 ena	1 ok ena	6 tumwii
OB	4 dina	4 toom dapti	7 gaati
DK	1 ande-	5 emi-	8 tereni-
DW	1 en-	5 mi-	9 atigo-
GL	3 kwaaniŋ	0	0

TABLE 7 (cont.)

English Dutch	sleep slapen	stand up opstaan	walk lopen	recline liggen
NS	8 sukep isenser	10 eton	1 uraar onimonim	7 ison
TF	1 akaanunemin	1 tolnin	2 telbanemin	1 akaanunemin
FA	1 akalumoo	1 todamin	3 kaaba	2 dakak tuul amin
BM	1 akare	2 mooraa	1 unbe	1 akaarbe
TL	1 àkàlúnémìn	2 mòòmìn	4 tíʸnèmìn	1 àkàlúnémìn
MN	1 ą unemin	2 mą	5 mąmą unemin	1 ąmpiepe
WG	1 awunenpi	3 anamano	6 yiwuneapi	0
KD	2 konob ibaŋkem	4 adabedeen	1 wenem	3 konob ibaŋkem
KM	2 konyob bin eŋko-	5 tambe-	7 bedeka-	4 eŋkee-
KN	3 tunuk aŋkee-	6 ketere-	8 yare-	4 aŋkee-
NN	4 awini	5 tabii	1 onem	5 binidibai
OB	5 timon paat	7 tandi	9 sabaat	0
DK	6 kimra ran-	8 mātere-	10 ko-	6 ran-
DW	6 kinum yan-	9 matigo-	10 ko-	6 yan-
GL	7 uimeb	0	0	0

English Dutch	sit zitten	swim zwemmen	cough hoesten	die sterven
NS	3 sipnar	12 ok papan un-	7 kasuk	8 denser
TF	1 tiinyamin	1 ook falamin	1 kàbònin	1 taanyaamin
FA	1 tainaamin	2 wok daŋ wakaamin	2 kʷoonin	2 kimin aamin
BM	1 tainbin	3 manruu kemin	2 koonin	1 kʷaan kemin
TL	1 tòònàmìn	4 òòk ààmìn	2 kòkònìn	1 kàànàmìn
MN	1 tourarin	5 dupdup unemin	3 howou arin	1 kanamin
WG	2 tompia	6 aiyiwape	4 idodanaimpe	1 kanepade
KD	1 tidem-	7 ambenem	0	3 ain
KM	1 tide-	7 aambi-	5 konom kadan-	3 ane-
KN	3 tiw-	8 aan yare-	5 konom taa-	4 popne-
NN	3 tibni	7 abenni	5 kadom	5 tawæœ kwien
OB	4 toŋnotin	9 mandu sabaat	2 kokoka-bat	6 kaubud
DK	5 mba-	10 ŏgŏ uŋgu-	6 oŭok tŭ-	5 kŭn-
DW	5 mba-	11 kimra ko-	6 ayak ti-	7 kim-
GL	0	0	0	0

TABLE 7 (cont.)

English Dutch	kill doden	person mens	name naam
NS	2 alep	1 kaka	6 nigil
TF	1 aŋkutila taanyaamin	2 unaŋ kinum	1 win
FA	1 aŋkabiu	2 wanaŋsoo kinimsoo	1 win
BM	2 are i kwaane	2 waneŋsoo kunumsoo	1 wiin
TL	2 ààmìn	2 ùnáŋ tánùm	1 ún
MN	3 yemin	2 nakaya unaŋa	2 ninin
WG	4 apepale	3 nakaite	0
KD	2 ayem	4 katuk	3 aniko
KM	5 -ne- kombe-	4 katuk	3 anyiŋko
KN	5 -ne-	4 katuk	3 aniŋko
NN	6 aeb kuwi	1 ka	4 kyeb dun
OB	7 suurit habud	5 kugaan	1 win
DK	8 ü-	6 küap	5 üp
DW	9 iro uru-	6 kagup	5 ip
GL	0	0	0

English Dutch	male mannelijk	female vrouwelijk	(my) father (mijn)vader	(my) mother (mijn)moeder	(my) elder brother (mijn) oudere broer
NS	1 imyayma	1 kolayma	1 aataŋ	1 aakul	1 baab
TF	2 tinum	2 unaŋ	1 atok	2 amon	1 ábaáb
FA	2 kinim	2 wanaŋ	1 naatim	3 naaŋin	1 baabnak
BM	2 kunum	2 waneŋ	1 aatim	4 yeem	2 ayook
TL	2 tànúm	2 ùnáŋ	1 áàtúm	5 âbeén	1 bàáb
MN	3 naka	2 unaŋ	1 ai	6 piem	3 hek
WG	0	0	0	0	0
KD	0	0	2 ambee	7 eena	0
KM	4 katuk	1 kon	2 ambe	7 enaŋ	4 ambaŋ
KN	4 katuk	2 wonoŋ	2 ampe	7 naŋ	4 ampa
NN	5 omgye	3 naŋai	3 idaŋ	7 neŋ	1 baab
OB	6 haan	5 kuu	1 aat	4 em, yem	2 ai
DK	7 mbetin	4 roŋgu	4 neti	8 nou	5 anet
DW	7 kombatim	4 raŋgui	4 nati	8 noi	5 net
GL	0	0	0	0	0

TABLE 7 (cont.)

English Dutch	(my) elder sister (mijn) oudere zuster	(my) younger brother (mijn) jongere broer	(my) younger sister (mijn) jongere zuster	drum trom
NS	1 onoŋ	1 niiŋ	1 niiŋ	1 wot
TF	2 ábaáb	1 niiŋ	2 neeŋ	1 was
FA	2 baabkun	1 niiŋ	2 neeŋ	1 woos
BM	3 ei	1 niiŋ	2 neŋ	2 woron
TL	2 bàábeén	1 nìiŋ	2 nèèŋ	1 òót
MN	4 en	1 niŋ	2 neŋ	1 was
WG	0	0	0	0
KD	0	0	0	1 wod
KM	5 ambaŋ	2 taman	3 taman	1 wot
KN	1 oni	2 taman	3 taman	1 wot
NN	1 onan	2 taman	4 kwontani	1 wot
OB	3 ai	3 naab	5 kunaŋ	2 waadon
DK	6 neni	4 anet	6 embiat	3 kinda
DW	6 nani	4 net	6 mbiat	3 kendet
GL	0	0	0	0

English Dutch	smoke rook	ashes as	arrow pijl	meat,flesh vlees	adze[64a] stenen bijl
NS	8 tabuŋ	9 amil	{2 aara {1 mase	11 kabeŋ	1 takol
TF	1 aslak	1 yeek	2 wan	1 nuuk	2 yakel fabi
FA	1 aslaik	2 kutub	2 (w)un	2 tadoob	3 fai
BM	1 deik	2 kuteb	2 oon	3 samaar	4 took
TL	2 àtúm	1 èèk	2 ún	4 díímdúm	5 mòók
MN	2 atum	3 kip	2 an	5 kuran	6 paŋkiri
WG	2 tumote	4 payisiote	2 anatote	6 edidote	0
KD	0	5 albo	2 ando	0	7 tamad
KM	3 amo iib	5 albo	2 ando	7 yom	7 taamat
KN	4 amot ten	6 itpot	2 ana	7 yom	8 taa
NN	1 awob adek	7 awowɔɔ	2 aa	8 bya	8 tɔɔ
OB	? 5 tuguŋ	8 taam	3 baan	9 abab	9 aganap
DK	6 in oruk	2 kotep	4 ŋgop	10 kandŏ	10 kurú
DW	6 enow uruk	2 kosep	4 ŋgop	7 yom	10 kori
GL	7 suluŋ	0	1 mat	0	7 malye

TABLE 7 (cont.)

English Dutch	root wortel	tree bark schors	feather veren, veer	to fly vliegen
NS	7 as irim	1 a kal	3 nal kamil	13 be unaar
TF	1 as timtim	1 as kaal	1 awon koon	1 tambaa telbanemin
FA	1 kimkim	1 as kaal	1 awon koon	2 faak una
BM	1 kimkim	1 ais kaar	2 (aon) karim	3 bire une
TL	1 tìmtím	1 àt kààl	1 úùn kòón	4 fúlúluú tíǐnèmìn
MN	1 kimkim	1 as ar	1 wan an	5 aimin
WG	2 tekete	1 isanadote	1 anote	6 sadiaponepade
KD	3 akibi	0	0	7 owadim
KM	3 a kimbi	1 kat	3 kimi	8 waa bedeke-
KN	3 kipikap	1 kat	3 kimi	9 won wene-
NN	3 a kuwi	1 a kaa	3 on kaami	10 dademaami
OB	4 kaked	2 idatwatag	4 ned bat	11 putsaabat
DK	5 igumbüt	3 kota	5 ron	8 mberene go-
DW	6 ndit	3 kotae	5 ron	12 ururuk ko-
GL	0	0	0	0

English Dutch	lizard hagedis	frog kikvors	star ster	sand zand	big groot
NS	1 awot	1 kol	7 mir	1 ok nimnim	1 daloki
TF	2 àtiìm	1 kool	1 wakalum	1 ook diniin	2 dakum
FA	2 atiim	1 kul	2 abil kayak	1 wok niŋniŋ	3 aalab seŋ
BM	2 aatiim	1 koor	3 meruum	1 ok rinin	4 fiyaanser
TL	2 átiím	1 kòòl	4 bìnìŋoók	1 òòk dínííŋ	5 àfálíkeén
MN	2 tim	2 map	5 awitrin	1 ririn	6 piserip
WG	0	2 mapote	0	1 dudinalim	7 nak^{w}iapate
KD	0	0	6 atonkoh	2 ambib	8 tadek
KM	0	3 aao	7 minoo	3 ok yedeb	8 taadeb
KN	0	1 kot	8 wot	1 ok yiiŋ	8 taarep
NN	2 adim	4 bumbya	7 min	1 ok diin	9 hoden
OB	3 deen	5 saat	3 medum	0	10 kii
DK	0	6 koak	7 minap	4 ŋgirim	11 koneni
DW	0	6 kak	9 mindui	5 ok yaman	12 kamae
GL	0	0	0	0	0

TABLE 7 (Cont.)

English Dutch	long lang	hot (water) warm	cold (water) koud	dry droog	good goed
NS	1 simit-ki	7 teŋ	1 nil	11 yel neser	1 mokmok
TF	2 batbat	1 mamin	1 diil	1 kokna	2 tambal
FA	1 kimisim	2 kait	2 iim	2 kadaŋsa	2 taŋbad
BM	3 tiyaakim	1 mamin	3 wais	3 tiyowe	3 atii
TL	1 tímítím	1 mìmín	1 dìil	4 dáŋànìn	2 támbáliím
MN	4 teke	1 mimin	1 gir	5 gat(an)	4 kereyam
WG	4 takaiminote	0	4 dudupa	6 haŋeno	4 kaditsemote
KD	5 kudub	3 nimin	4 dyuduk	7 kaam	6 kaimo
KM	6 baŋkan	3 nimin	4 yuduk	8 dab	7 amun
KN	7 kataat	4 wiŋ	4 yuruk	1 kok	7 amun
NN	8 gumtit	3 namin	5 giwubo	1 kok	8 daab
OB	9 dookan	1 mamiin	6 gidiid	5 hagaatin	9 yagaa
DK	10 ŋguruop	5 ndam	1 ŋgit	9 tomap	10 wonden
DW	10 ŋgurup	1 mamin	7 sarui	10 kerewet	5 wagae
GL	0	6 madyaa	8 rumi	0	0

English Dutch	full vol zijn	new nieuw	white wit	black zwart
NS	4 tibenser	11 papiki	9 kol(ki)	5th bir(ki)
TF	1 doŋayaamin	1 aluksoo	1 nàmaàl	1 duut
FA	2 wainbu	2 kikiso	1 namaal	2 mitik
BM	3 mene wene	2 kikis	2 yemurete	3 mikiirnam
TL	1 dòóŋénàmìn	3 kàmaá	1 nàmaál	4 ìím
MN	4 sippe	4 mema	1 nama	5 mirirum
WG	5 witadepe	5 kaditsemo	3 wuninote	6 hamidapiye
KD	6 totedon	6 kayumo	4 kawan	7 bin
KM	6 yootede-	7 kudi	5 kuk-kondi	2 mitiboob
KN	7 ketere-	7 kiri	5 kukni	2 mitikni-kono
NN	2 wee kaden	8 kaweb	6 kawɔɔb(bo)	8 kaadubbo
OB	8 teibotpaat	9 kaabenowei	7 adu	9 kwii
DK	9 tome-	10 are	8 koat	10 ŋgürüp
DW	10 koya ke-	10 ariok	5 kuk	9 kui
GL	0	0	0	0

TABLE 7 (cont.)

English Dutch	red rood	bring meebrengen	know weten,kennen	say spreken
NS	7 yapiki	1 bulotai	8 ebeŋsaar	11 weŋ deben
TF	1 fiiŋim	2 kuli telemin	1 utamyaamin	1 weeŋ bakaamin
FA	2 kas	3 kutamo tadaada	1 utamsab	1 bakaamin
BM	3 giik	4 re tara	1 atemse	1 bakamin
TL	4 ìsákúlùt	2 k^{w}ééb télémìn	1 ùtámámìn	1 bákámìn
MN	5 irem	4 rerep teremin	2 takeiŋ kemin	2 panepe
WG	5 idemote	0	2 takaino	3 adenaipipade
KD	6 tokatak	0	3 kadan	4 owaton
KM	7 yamu-kondi	5 ka mene-	3 kaat kede-	5 muŋke-
KN	7 yam-tee	6 kon mene-	3 kaat kere-	6 yeetme-
NN	7 dambo	6 kwo mede	4 nekaa	7 weŋ haŋ
OB	8 keimsii	7 foabdiin	5 aama	8 meŋ adiibat
DK	9 tenop	8 timo me-	6 noam ge-	9 arek tagamo-
DW	9 tenop	4 rap me-	7 ŋgoropmo-	10 rogo-
GL	0	0	0	0

English Dutch	hear horen	see zien	it burns verbranden	come komen
NS	1 weŋsaar	11 tamer	7 kikinaar	5 sebaabe
TF	1 weeŋ sanyaamin	1 atamyaamin	1 as kiin tabemin	1 telemin
FA	2 kidili	1 watamaamin	1 as kainaamin	1 tadaalo
BM	0	1 uutema	2 waiŋ aire	1 teremin
TL	3 tìnáŋkámìn	1 ùtámámìn	1 àt kèènàmìn	1 télémìn
MN	4 weŋ temin	1 watamemin	0	1 teremin
WG	5 wuntade	1 yitemewipe	3 asoyempopade	2 aletewepe
KD	6 abada	0	1 amo-tenem	3 meene
KM	6 aambede-	1 teme-	4 neŋka-	3 mene-
KN	6 weŋ ambere-	1 wetme-	4 neŋke-	3 mene-
NN	7 weŋ te	2 aakme	1 tenen	3 medę
OB	8 amdaatin	3 wamtin	5 idaat haas	4 aabdiina
DK	9 ndot-	4 itigio-	6 ondŭ-	3 me-
DW	9 ndat-	5 eto-	6 undo-	3 me-
GL	0	0	0	0

TABLE 7 (cont.)

English Dutch	many veel	nothing niets	all alle(s)	enough genoeg	night nacht
NS	14 dirop dirop	1 doo	8 dito yuma	1 sikip	12 yaabun(aar)
TF	1 yaabkan	2 diniim	1 alik	2 tii	1 kutamiib
FA	2 deŋdeŋ	3 banim	1 adikum	2 ki	2 am midla
BM	3 bansoo	3 banim	1 arik(arik)	2 kii	3 k^{w}iine minirib
TL	4 tàkáŋ	3 bínim	1 àlúkùm	2 tii	3 mililiib
MN	5 homon	3 birim	1 arukum	3 baina	4 k^{w}inamin
WG	6 kikalipo	0	2 kikulipone	0	5 amoyokenopade
KD	7 mudumkon	1 dowan	3 kodan	4 ib	6 amdom
KM	8 butaŋken	1 doan	3 kodem	4 iib	7 mitik
KN	9 yewut	1 noo	3 korem	4 tiip	8 am kiti
NN	10 inumbwib	1 duam	4 mwiŋgin	5 maimo	9 amgumdi
OB	11 taduuna	4 timbas	5 gonsii	6 kiiwa	10 huteema
DK	12 agöp	1 nda	6 mēp	7 kare-	11 wemin
DW	13 kutok	1 ndoi	7 amukmo	7 kare	7 mitik
GL	0	0	0	0	0

English Dutch	one een	two twee	what wat	who wie
NS	1 maki (adj)	8 laao	3 minamin	6 minaki
TF	1 maakub	1 aleb	1 kanim	1 wanta
FA	1 maakub	1 aleb	2 watab	2 kaanta
BM	1 makub	1 areeb	2 nimteb	3 niminte
TL	1 maakub	2 áloòb	2 íntáb	1 wàántá
MN	2 ereyem	3 asu	3 nimin sapmin	1 wane-
WG	3 maŋkopo	4 sukepo	4 weno(pa)...	1 wune-
KD	4 mimo	2 adob	0	0
KM	4 mimmo	2 adob	5 moman	2 kande
KN	4 mim	2 ayoop	6 komo	2 kane
NN	4 mwim	2 hadob	0	0
OB	5 titwii	5 yota	7 kyagan	4 nig
DK	6 ome	6 rumo	8 kenemop	5 koap
DW	6 omae	6 irumo	9 agaeop	5 agap
GL	7 teltəleknya	7 bətiŋyi	0	0

TABLE 7 (cont.)

English Dutch	I ik	thou (m) jij, gij	we wij
NS	0	0	0
TF	1 na-	1 kab-	1 nu-
FA	1 na-	1 kab-	1 nu-
BM	1 ne	1 kab-, koo-	1 nuu
TL	1 ni-, na-	1 kab-	1 nu-, no-
MN	1 ne-	1 kep-	2 ni-
WG	1 nete	1 kapote	3 sokepo (dual) ataŋkepo (plural)
KD	1 ne	2 ko	4 nub
KM	1 ne	1 eb	4 nub
KN	1 ne	1 tep	4 nup
NN	1 ne	1 keb, kyeb	2 ni (incl.), nib (excl.)
OB	2 nog	2 go	5 dit (dual inclusive) did (plural inclusive) nuut (dual exclusive) nuud (plural exclusive)
DK	3 nöp	3 ŋgöp	6 noŋgüp
DW	3 nup	3 ŋgup	6 naŋgup
GL	0	0	0

Note. The Dutch entries given in Tables 6 and 7 are not always the preferred translation equivalents of the English entries, but are rather the entries found in the word lists by Drabbé and Geurtjens. Modern Dutch spelling is used here. Drabbé sometimes has y for modern ij, and has asse for modern as 'ash(es)'. Geurtjens has final sch for modern s and in some verbs has a doubled vowel where modern spelling has a single one.

For the present lexicostatistical purposes, several kinds of probable cognates were counted as non-cognates on the grounds that their proto-forms appear to belong to an older stage of the parent language than the Proto-Ok represented in the majority of the cognate decisions. In this category are word pairs that correspond in all respects except that one word of the pair involves "loss" of an intervocalic /l/, /k/, /ŋ/, or /y/. E.g.

FA	/falaŋ/,	TL	/fòóŋ/	'tongue'
TL	/túkúl/,	UT	/tuul/	'fat'
NN	/miŋatem/,	NK	/meaatem/	'mouth'
FF	/mayaan/,	FA	/maan/	'dog'[65]

In comparisons involving OB, DK, DW or GL judgements of cognateship were based upon similarity and plausible sound correspondences, and the standard was generally more lax than that applied within the Ok Family.

One problem arose while identifying cognates which the author has not seen adequately discussed in the literature on lexicostatistics, namely, what decision should be made when one or both of the items being compared is a compound and only one component morpheme can be shown to be cognate.[66] Should the two items be regarded as cognate or not? One may adopt a stringent policy and ignore the existence of morpheme boundaries within words and require that to be counted as cognates two words should show good correspondences for every or almost every phoneme. Of course regular "loss" of an initial or final phoneme or syllable may be one kind of correspondence, but not the irregular loss of whole morphemes. For example, by this policy, FA /daaŋ/ 'back' and FF /daaŋ kun/ 'back' would be treated as non-cognate, as would FA /aslaik/ 'smoke' and NN /awob adek/ 'smoke' (/as/ and /awob/ both mean 'fire', and /laik/ and /adek/ are cognate morphemes meaning 'smoke').[67]

However, it seems reasonable to relax this policy somewhat in certain cases. In this present work, whenever the author felt he could identify one part of a compound as semantically central and the other part as semantically peripheral, only the morpheme constituting the semantic focus (with respect to the accepted area of meaning of this item on the standard test list) was used in identifying cognates. In the examples above /kun/ 'bone, part of body containing bones', /as/ 'fire', and /awob/ 'fire' may all be viewed as semantically peripheral, and with the elimination of these, both pairs of items can then be regarded as cognates under this less stringent policy.

In assessing semantic centrality, any morpheme which is usual but optional in its occurrence within an item of a given meaning is regarded as semantically peripheral; the morpheme whose meaning comes

closest to the particular meaning on the standard test list is regarded as semantically central.[68] One aid in comparing meanings from this point of view is the concept of the degree of breadth or generality of meaning of a morpheme as measured by the number of compounds in which it occurs.[69] For example, in TL /dùboóm kòóń/ 'hair', /kòóń/ 'hair, leaf' is regarded as semantically central and /dùboóm/ 'head' as peripheral, on the grounds that the former has a meaning much closer to the 'hair' of the standard test list than does the latter. Again, in TL /kátuùn (kún)/, because of its optional nature, /kún/ 'bone, body part containing bone' is treated as semantically peripheral, and /kátuùn/ 'knee' as central.

In the absence of adequate descriptive information (both grammatical and semantic) for a given language, the criteria of optional occurrence and semantic closeness to the meaning of the standard test list may be applied by comparing the words for a given meaning in all the languages. By such interlingual comparison it is often possible to tentatively identify morphemes within a compound, their meaning, and whether their occurrence is fixed or optional. For example, no specific information is available concerning the morphology of Setaman nor about the composition of FS /mur kun/ 'back'. However, a comparison of the words for 'back' and other body parts in the other languages make it appear likely that /kun/ is a morpheme in FS body parts with the meaning of 'body part containing bones'. The occurrence of BM /muur/ 'back' points to the identification of FS /mur/ as a morpheme meaning 'back', and indicates the interlingual optional occurrence of /kun/ in the "words" for 'back'. The conclusion to be drawn from these arguments is that in the Setaman "word" for 'back' /mur/ is probably the semantically central morpheme. A similar argument may be applied to FI /as dawoŋ/ 'fire', MN /go-kim/ 'louse', and BM /amgu tikin/ 'mountain'.

Such interlingual comparisons can only give insights into the semantic composition of words at some earlier period in the history of the languages compared, and the results so obtained have only mediocre reliability when applied to compounds in the present-day language. In assessing semantic centrality of the components of a compound, information from within that language should always be preferred to interlingual information.

Often it is not possible to identify a semantic focus in a compound because (a) the meaning of each component morpheme seems equally pertinent or close to the meaning specified in the standard test list, or (b) one component morpheme is unique and no satisfactory meaning can be established for it, or (c) though compounding is suspected it is not possible to identify component morphemes with any certainty. In all such situations the author has used the whole compound in identifying cognates.[70] Examples of the above three kinds of situation are: (a) TF /ool kun/ 'back', since

/ool/ 'excreta' and /kun/ 'bone, bony part of body' both seem equally distant from the meaning 'back'.[71] (b) KW /waimsan/, TL /umsan/, and similar words for 'tail' appear to contain a morpheme /san/ (compare FG /weim/, FA, FW /wem/) but it has not been possible to locate any other occurrences of such a morpheme nor even to guess at its meaning. Apparently unique components also occur in KN /kaŋtom/ 'knee', KM /ambib/ 'house', and NN /amkwon haab/ 'mountain'. (c) FA /dummoob/, KM /dimyob/, NN /dimtob/ versus KD /bibiob/, KN /mimyop/ appear likely cognates if only something were known of their morphemic content. They may well have all come from a proto-form such as */dim-job/ 'heart' (lit. 'body-ball'), but as no evidence is available to identify two morphemes in each of the present-day words, these two sets cannot be considered cognate. It is obvious that cognate decisions in situations (b) and (c) depend considerably on how well each individual language is known to the investigator, a state of affairs that pertains to all phases of language comparison.

One compound occurred in the lists which should perhaps have been handled as an example of situation (a) above. It is BM /k^{w}iine minirib/ 'night', which was arbitrarily treated as cognate with TL /mìlìlìib/ and non-cognate with MN /k^{w}iina-min/, although it seems likely that both of its component morphemes equally mean 'night'.

Tables 6 and 7 provide evidence for the degree of persistence within the Ok Family of the individual items on the standard test list. To make use of both tables in the same way consideration has been given to only 11 languages and dialects: NS, TF, FA, BM, TL, MN, WG, KD, KM, KN, and NN. For each item of the test list a count was made of how many different cognate sets were represented in these eleven languages (as indicated by how many different numerals occurred for these languages in the particular column of the table). The stable or most persistent items, those showing only one or two different cognate sets in 11 languages, are listed below, as are the unstable or least persistent items, those showing 7 or more different cognate sets in the 11 languages. Of the 120 items used in this lexicostatistical study, 90 were taken from Swadesh's 100-item test list, 6 were taken from his supplementary list, and the remaining 24 were added because of their cultural importance or because of their occurrence on most of the word lists used in compiling Tables 6 and 7. Each of these groups of items may be classified according to the persistence of the individual items as follows:

	STABLE 1 or 2 different cognate sets	AVERAGE 3 to 6 different cognate sets	UNSTABLE 7 to 10 different cognate sets
Swadesh 100	15 items I, thou, woman, bird, louse, tree, bark, skin, bone, egg, tongue, see, sun, water, stone	55 items	20 items many, big, long, small, meat (flesh), hear, swim, fly, walk, say, star, ground (earth), ash(es), red, black, night, full, new, good, dry
Swadesh suppl.	-	5 items wind, snake, back, father, child	1 item mother
Other	9 items house, sago, taro, banana, string-bag, younger-brother, drum, arrow, lizard	14 items cassowary, sugar-cane, sweet-potato, pig, frog, bring, enough, shoulder-blade, cough, male, female, elder-brother, elder-sister, younger-sister	1 item adze

Thus the 30 items which are not taken from the Swadesh 100-item test list are, as a whole, slightly more stable than the 90 Swadesh items. (The 30 have an average of 3.9 different cognate sets per item and the 90 items from Swadesh's 100 have an average of 4.7 different cognate sets each.) Thus the total list of 120 items used here is slightly more retentive than Swadesh's 100. Another very marked feature of the persistence scores in the Ok Family is that pronouns and nouns are much more stable than verbs and adjectives.[72] The average number of different cognate sets per item for each grammatical class (Ok classes, not English) found in the 90 items from Swadesh's 100 is as follows:

3 pronouns have 2.3 cognate sets each;
52 nouns have 4.0 cognate sets each;
19 verbs have 5.3 cognate sets each;
16 adjectives have 6.6 cognate sets each.

To determine the percentage of probable cognates that two languages share in a given list of words, one compares the two lists, taking each corresponding pair of words at a time and counting the

number of occurrences of each of three kinds of situation. Either (a) the two words are cognate (have the same preposed number), or (b) the two words are non-cognate (have different preposed numbers), or (c) a comparison is not possible because of lack of information (either or both of the numbers is zero). The proportion of cognates (often expressed as a percentage) which the two word lists have in common is

$$\frac{a}{a+b} \quad \text{or} \quad \frac{a}{n-c}$$

where $n = a + b + c$ is the size of the lists employed. The counting and calculating involving Tables 6 and 7 is quite considerable, so this was programmed for an IBM 1620 computer.[73] The results for the 50 meanings (columns) of Table 6 are presented in Table 8. The result for any two languages is found at the intersection of the column and row containing the symbols for those two languages. The intersection in the upper right half of the table gives the cognate proportion to the nearest percent, and the intersection in the lower left half of the table gives the number of comparisons used to arrive at this percentage, namely $a + b = n - c$ comparisons. The results for the whole 120 meanings in Tables 6 and 7 for the 15 languages common to both tables are presented in Table 9. To get a clearer picture of the position of NS, a special comparison of these 15 languages was made using 36 selected meanings in which NS was fully represented. The results appear in Table 10.

In interpreting the results of this lexicostatistical study it has been assumed that the higher the cognate percentage the more closely related are the two languages concerned.[74] On this basis the following conclusions have been drawn:

(a) The existence of five Divisions within the Ok Family is confirmed, and these Divisions have the same composition as set out in the Introduction.

(b) The grouping of these five Divisions into Sub-Families is rather uncertain until more information is available from Ngalum dialects. The averaged results for the five Divisions are as follows:

MOB	39	28	23	19
	MOA	38	26	22
		NS	39	24
			LOB	39
				LOA

Averages from Table 9.

MOB	45	27	28	25
	MOA	40	28	24
		NS	39	24
			LOB	46
				LOA

Averages from Table 10.

These figures seem to support the alternative classification presented in the Introduction. However, further comparison of fuller

TABLE 8. LEXICOSTATISTICAL COMPARISONS FOR 50 ITEMS

Percentages of Probable Cognates

NS	60	60	64	60	70	53	53	53	47	60	47	63	53	40	40	21	20	43	36	40	47	53	53	7	7	13	0
15	TA	92	87	74	76	76	70	68	68	67	58	53	82	54	50	28	30	30	31	32	34	34	44	10	6	6	17
15	50	TF	96	76	83	74	68	66	70	65	58	53	76	54	50	28	32	30	33	32	36	36	44	12	4	4	13
14	47	47	TW	79	83	77	68	64	68	63	57	57	74	55	51	26	32	30	34	32	36	36	43	11	7	7	13
15	50	50	47	KW	79	82	80	76	80	69	66	67	70	46	40	28	30	35	33	34	38	38	48	14	8	8	13
10	42	42	41	42	FI	86	81	74	76	66	64	60	81	52	48	24	29	34	33	33	29	29	43	14	7	7	10
15	50	50	47	50	42	FG	84	84	82	73	64	69	84	52	46	28	30	33	31	32	36	36	44	16	8	8	13
15	50	50	47	50	42	50	FF	88	84	78	68	69	76	50	46	22	26	33	31	32	34	34	46	14	8	8	13
15	50	50	47	50	42	50	50	FA	90	84	70	69	74	50	46	26	26	35	33	34	36	36	48	14	6	6	13
15	50	50	47	50	42	50	50	50	FW	82	70	69	72	48	42	24	26	33	31	32	34	34	46	16	8	8	13
15	49	49	46	49	41	49	49	49	49	FS	69	66	69	51	47	27	24	33	32	33	37	37	47	14	6	6	9
15	50	50	47	50	42	50	50	50	50	49	BM	89	62	42	44	24	28	35	33	34	36	36	48	20	6	6	13
8	36	36	35	36	35	36	36	36	36	35	36	BK	61	44	44	21	25	33	33	33	39	39	50	25	6	6	11
15	50	50	47	50	42	50	50	50	50	49	50	36	TL	60	54	30	30	33	31	32	36	36	46	14	8	8	17
15	50	50	47	50	42	50	50	50	50	49	50	36	50	MN	76	24	28	26	29	26	32	32	36	8	6	8	13
15	50	50	47	50	42	50	50	50	50	49	50	36	50	50	WG	24	28	28	31	28	32	32	34	10	4	4	13
14	46	46	43	46	38	46	46	46	46	45	46	34	46	46	46	KD	78	55	61	63	41	39	30	4	11	11	5
15	50	50	47	50	42	50	50	50	50	49	50	36	50	50	50	46	KM	54	60	60	44	44	34	4	14	10	4
14	46	46	43	46	38	46	46	46	46	45	46	33	46	46	46	42	46	YM	82	78	52	50	43	4	11	11	9
14	48	48	47	48	42	48	48	48	48	47	48	36	48	48	48	44	48	44	KA	90	50	48	40	4	11	9	13
15	50	50	47	50	42	50	50	50	50	49	50	36	50	50	50	46	50	46	48	KN	54	50	44	4	10	10	13
15	50	50	47	50	42	50	50	50	50	49	50	36	50	50	50	46	50	46	48	50	NN	90	66	6	8	8	9
15	50	50	47	50	42	50	50	50	50	49	50	36	50	50	50	46	50	46	48	50	50	NK	70	6	8	8	9
15	50	50	47	50	42	50	50	50	50	49	50	36	50	50	50	46	50	46	48	50	50	50	UT	8	10	10	9
15	50	50	47	50	42	50	50	50	50	49	50	36	50	50	50	46	50	46	48	50	50	50	50	OB	0	0	4
15	49	49	46	49	41	49	49	49	49	48	49	35	49	49	49	45	49	45	47	49	49	49	49	49	DK	51	0
15	49	49	46	49	41	49	49	49	49	48	49	35	49	49	49	45	49	45	47	49	49	49	49	49	49	DW	0
6	23	23	23	23	20	23	23	23	23	22	23	19	23	23	23	22	23	22	23	23	23	23	23	23	22	22	GL

Numbers of Words Compared

TABLE 9. LEXICOSTATISTICAL COMPARISONS FOR 120 ITEMS

Percentages of Probable Cognates

NS	39	39	32	42	29	26	22	19	31	39	5	8	11	11
38	TF	60	52	68	46	35	19	22	25	27	8	3	3	9
38	120	FA	59	63	40	31	18	21	25	27	8	6	5	9
38	118	118	BM	57	39	30	17	19	23	24	17	4	7	12
38	120	120	118	TL	53	38	22	22	25	27	10	5	5	12
38	119	119	117	119	MN	56	16	21	21	24	7	4	6	9
23	100	100	99	100	99	WG	16	20	21	21	5	2	2	10
27	97	97	95	97	96	86	KD	66	52	33	3	7	7	10
36	118	118	116	118	117	100	97	KM	62	39	2	11	10	6
36	118	118	116	118	117	100	97	118	KN	44	2	7	9	9
38	118	118	116	118	117	98	97	116	116	NN	3	9	7	6
38	118	118	116	118	117	99	95	116	116	116	OB	0	3	3
36	117	117	115	117	116	99	96	117	117	115	115	DK	56	0
36	117	117	115	117	116	99	96	117	117	115	115	117	DW	0
9	33	33	33	33	33	31	31	33	33	33	33	32	32	GL

Numbers of Words Compared

TABLE 10. LEXICOSTATISTICAL COMPARISONS FOR 36 SELECTED ITEMS

Percentages of Probable Cognates

NS	42	42	33	42	28	26	22	19	31	39	6	8	11	11
36	TF	69	53	81	50	39	26	25	28	31	6	8	8	11
36	36	FA	61	78	50	39	22	19	28	28	6	6	6	11
36	36	36	BM	58	44	35	19	17	25	22	14	6	8	11
36	36	36	36	TL	56	43	26	25	28	31	6	8	8	11
36	36	36	36	36	MN	65	26	25	25	25	6	8	11	11
23	23	23	23	23	23	WG	24	26	26	30	4	4	4	13
27	27	27	27	27	27	21	KD	63	59	48	0	15	15	33
36	36	36	36	36	36	23	27	KM	61	39	0	19	14	22
36	36	36	36	36	36	23	27	36	KN	50	0	14	14	11
36	36	36	36	36	36	23	27	36	36	NN	3	11	11	11
36	36	36	36	36	36	23	27	36	36	36	OB	0	0	0
36	36	36	36	36	36	23	27	36	36	36	36	DK	67	0
36	36	36	36	36	36	23	27	36	36	36	36	36	DW	0
9	9	9	9	9	9	8	9	9	9	9	9	9	9	GL

Numbers of Words Compared

lists for more languages may well show the suggested groupings of these five Divisions to be spurious, with these five taking on the status of Sub-Families and the higher percentages between geographically contiguous Sub-Families being due to continued interaction after the original breakup of the parent language.

(c) Most of the MN and WG figures are similar to each other, but in Table 9 the comparisons of MN with MOA languages are an average of 11% larger than the comparisons of WG with MOA languages. (MN with TL is 15% larger than WG with TL.) Likewise an average difference of 11% is seen in Table 10, but only an average difference of 4% is seen in Table 8. These differences probably point to a measure of interaction between MN and MOA or between MN and TL (during the last millenium?). Similarly, UT shows comparisons with MOA that are 11% higher on the average than those of NN and NK, and interaction between UT and MOA may be inferred.

(d) Incomplete word lists are likely to produce unreliable results, as may be seen by comparing the NS comparisons with other languages in Tables 8 and 9. Table 10 was prepared specifically to eliminate this relative uncertainty in the NS figures. Although BK and FI also have somewhat incomplete lists in Table 8, there is no doubt as to which Division they belong to.[75]

(e) The minimum figures in Table 9 within the Ok Family average about 22%. If one accepts the general principles of glottochronology and Swadesh's figure of 86% retention per millenium for his 100-item list, then this minimum would represent a time depth of about five millenia. As the lists used in this present study have been shown to be more retentive than Swadesh's 100, it is to be expected that five millenia may well be an underestimate of the antiquity of the parent language, Proto-Ok.

(f) From a consideration of the geographical centres of the Divisions and Sub-Families presented in the first classification in the Introduction, it appears likely that Proto-Ok had its home on the headwaters of one of the south-flowing rivers, such as the Arip River valley at the head of the Ok Tedi.[76]

(g) Three different cognate percentages have been suggested as the typical or average transition point between dialect and language status: Swadesh suggested 81%, Dyen has suggested 70%, and Wurm and Laycock have implied 60%, using the Swadesh 200-item test list.[77] For the Swadesh 100-item test list these would correspond to 86%, 77% and 70% respectively. A careful comparison of the figures in Tables 8 and 9 indicates that the former tend to exceed the latter by amounts up to an average of 9%. From a calibration curve it is estimated that 86%, 77% and 70% in the Swadesh 100-item list and in Table 9 would correspond approximately to 90%, 83% and 78% respectively in Table 8. Table 8 has been evaluated by these three standards as is shown in the following list of "languages":

90%	83%	78%
Sibil NS	Sibil NS	Sibil NS
Tifal TA-TF-TW	Tifal TA-TF-TW	Tifal TA-TF-TW
Kauwol KW	Kauwol KW	Kauwol KW
Imdalmin FI		
Gipman FG		
Faiwolmin FF	Faiwol FG-FF-FA-FW	Faiwol FG-FF-FA-FW-FS
Central Faiwol FA-FW		
Setaman FS	Setaman FS	
Bimin BM	Bimin BM-BK	Bimin BM-BK
Kuskusmin BK		
Teléfól TL	Teléfól TL	Teléfól TL
Mianmin MN	Mianmin MN	Mianmin MN
Wagarabai WG	Wagarabai WG	Wagarabai WG
Digoel KD	Digoel KD	
Metomka Kati KM	Metomka Kati KM	Southern Kati KD-KM
Yonggom YM	Yonggom YM	
Ninatie Kati KA-KN	Ninatie Kati KA-KN	Northern Kati YM-KA-KN
Ninggirum NN-NK	Ninggirum NN-NK	Ninggirum NN-NK
Upper Tedi UT	Upper Tedi UT	Upper Tedi UT

In both the 83% and 78% columns FI has been omitted, since it is equally related to both Tifal and Faiwol.

3. RELATIONSHIPS OUTSIDE THE OK FAMILY

In the main body of New Guinea between the 138th and 144th meridians there is tremendous linguistic diversity. There appear to be several hundred languages spoken there, and even when many more of them are better known it is unlikely that linguistic classification will yield fewer than 50 families of languages. The inset map attempts to assess our present knowledge of this region in terms of linguistic families.[78] As many as possible of the families of languages neighbouring the Ok Family will now be examined both for their own internal coherence and for their linguistic contrast with the Ok Family.

3.1 THE NEIGHBOURS OF THE OK FAMILY[79]

The UPPER SEPIK FAMILY or stock of about 6,000 speakers has been tentatively classified by Laycock, and includes at least Djarok (Abau), Iwam, and Wogamusin, and perhaps Ki (Amto), Chenapian, and the language spoken at the mouth of the Yellow River.[80]

The LEFT MAY FAMILY of perhaps 2,000 speakers has been surveyed by R. Conrad of the Summer Institute of Linguistics, and includes Apaka-Abi-Aboa, Asowi, Laro, Nimo-Wasuai, Nakwi-Mumupra-Aukot, and perhaps Samo.[81]

In the sparsely populated area south of the Sepik between the May River and the April River at least 6 languages have been reported: Mamiap-Ariap (Breenugu), Nakiai, Pai, Suarmin, Sisimin-Hewa (Kewa), and Gohom. Nothing is known of their family relationships at this stage.

The OKSAPMIN language has about 4,000 speakers and is divided into several dialects.[82] No closely related languages have been discovered, and Oksapmin must be regarded as having the same classificatory status as a family.

The DUNA language has about 14,000 speakers. It is not closely related to any other language and should be regarded as having the same status as a family.[83]

The ENGA-HULI-POLE-WIRU FAMILY of about 253,000 speakers has been carefully delineated by Wurm and consists of the following groups: Enga, Kyaka, Ipili, Lemben, Huli, Huliduna, Mendi, Kewapi, Pole, Augu, Sau, and Wiru.[84]

East of the Strickland River between the Muller Range and the Bosavi Mountains at least 6 languages have been reported: Daba, Biami, Orogo, Supei, Gebusi, and Su (Du). A short word list from Supei indicates that it for one does not belong to any of the other families listed in this section.[85]

The AWIN-PARE FAMILY of 9,000 speakers is a tentative grouping by the present author, and includes Akium-Awin (Aekyom), Akium-Pare, and Pare (Pari).

The MARIND-KUNI FAMILY of 16,000 speakers was first identified by Murray and Ray.[86] There appear to be two sub-families: (a) Marind dialects and Yaqai (Sohur);[87] (b) Kuni dialects (including Boazi) and Zimakani-Baegwa (Dea).

The AWYU-DUMUT FAMILY of about 20,000 speakers has been established by Drabbé. There appear to be two sub-families: (a) Awyu, including Syiagha-Yénimu-Oser, Pisà, Aghu (Djair), Mitak, and

Kotogüt; (b) Dumut, including Kaẹti (Nub), Wambon, and Wanggom.[88]

The CENTRAL SOUTH COAST FAMILY of perhaps 42,000 speakers has been established by Drabbé. This family includes Kamoro, Sempan, Asmat, Neferipi, and Tjitjak.[89]

In the mountain valleys both north and south of the central watershed between 139°25' and 140°05 longitude a family of languages is spoken that is distinct from the surrounding linguistic families, but the only published specimen is that from Mt. Goliath.[90]

The DANI FAMILY of perhaps 100,000 speakers has been carefully delineated by M. Bromley, and includes Western Dani, Grand Valley Dani, Eastern Dani, Southern Dani, Ndugwa, and Wano.[91]

Nothing is known about the people and languages on the lower Sobger River, or on the eastern tributaries of the A River.

3.2 PHONOLOGY

The consonantal systems found in the language families neighbouring the Ok Family are relatively simple in that they have only 11 to 16 consonant phonemes, and all with very ordinary phonetics. For instance, most languages have the symmetrical set /p/, /t/, /k/, /b/, /d/, /g/, /m/, /n/, /ŋ/, as well as /s/, /w/, /y/, and /r/ or /l/. Some of the other consonants that occur are listed: Djarok has /ǰ/, /f/ or /h/, and no voiced stops; Iwam has /g/ and /ʔ/; Oksapmin has /h/ [x], /kʷ/, and /gʷ/; in addition to three voiceless and three voiced prenasalized stops Duna has /b/, /t̪/, and /g/; both Duna and Enga-Huli-Pole-Wiru have /r/ and /l/ in contrast, and lack /ŋ/; Awin-Pare has /h/; Marind has /v/, /z/, and /h/; Awyu has /f/ and /g/ or /x/, and many Awyu-Dumut languages lack /ŋ/; Central South Coast lacks voiced stops, /ŋ/, and /s/, and makes up for this by having five semi-vowels, /č/, and /h/ or /f/; Dani has /kʷ/ and /gʷ/, and many Dani languages have /b̆/, /d̆/, and /s/ and lack /ŋ/.

All of these families seem to have at least 5 vowels. The following notes indicate where the vowel inventory exceeds the common /a/, /e/, /i/, /o/, /u/. Upper Sepik has /ə/; Duna has /æ/, /ʌ/, /ɔ/ and a set of nasalized vowels; Sau has /ə/, Mendi has /ə/ and /æ/, and Pole and Sau each have a set of nasalized vowels in addition to the oral vowels; Awin-Pare has /æ/ and perhaps /ɔ/; Kuni /æ/; Awyu /ɯ/, and /ɛ/ (vs. /e/), and Kaeti /ɯ/ and /ɤ/; Central South Coast /ə/, and /ɛ/ (vs. /e/); and Dani /ɪ/ and /ʊ/. Aghu and Pisà in the Awyu-Dumut Family also have sets of nasalized vowels, but a careful study of Drabbé's grammars and vocabularies shows that these nasalized vowels may be interpreted phonemically as oral vowel followed by nasal phoneme, e.g. [ạ] = /an/.[92] Central South Coast has a system of vowel harmony.

Phonemic vowel length occurs in Oksapmin and Enga, and perhaps in Marind, Aghu (Awyu), and Central South Coast.

Iwam (Upper Sepik) appears to have lexical pitch, Oksapmin has some unexplained pitch features, Duna has two tonemes, the Enga-Huli-Pole-Wiru languages all have lexical pitch (Enga has two tonemes). Awin and Pare seem to have contrastive stress, although Akium-Pare monosyllables possibly show contrastive pitch, Marind has non-phonemic stress, Dumut has non-phonemic stress, but Awyu has phonemic stress (except Aghu, perhaps), Central South Coast has phonemic stress, and Dani has non-phonemic stress.

Most language families in this area have both closed and open syllables. However, Duna, Enga and several other languages of its family (but not Mendi) appear to have only open syllables, and in Awin-Pare, Awyu (but not Dumut), and Kamoro and Sempan of the Central South Coast Family open syllables predominate. Only in Wogamusin (Upper Sepik), Mendi, and Dumut do closed syllables predominate. Word-initial consonant clusters occur in Upper Sepik (/kl/, /pl/), Awin-Pare (/kr/, /pr/, /tr/, /gr/, /dr/, /sr/, /sm/), and Central South Coast (/bw/, /mw/). As far as diphthongs are concerned (that is, vowel clusters which apparently constitute a single syllable), /ei/, /au/, and /oi/ have been noted in Oksapmin, and many diphthongs occur in the Awin-Pare, Marind-Kuni, Awyu-Dumut, Central South Coast and Dani Families.

3.3 NOUNS

Nouns seem not to be marked for plurality in the majority of cases. In Upper Sepik they are never marked, and in Marind-Kuni and Awyu-Dumut some human nouns only are marked for plurality by vowel change and suffixation respectively.

The Upper Sepik languages have from 6 to 12 noun classes and a cross-cutting 2-gender system. Marind-Kuni has a 2-gender system that involves concord by vowel-shift. All of the other families seem to have no system of noun classes or gender.

Compounds formed from two noun stems have been observed in Upper Sepik, Oksapmin, Marind-Kuni, Awyu-Dumut, and Central South Coast. In all of these families the semantic relationship between the two nouns is similar to that in a possessive construction, with the first noun as "possessor". Perhaps the commonest variety is a whole-part semantic relationship.

3.4 NUMERALS

Upper Sepik numerals are based on quinary and decimal systems, with the numerals for 5 and 10 <u>not</u> containing the morpheme for 'hand'. The numerals 1, 2, 3, and sometimes 4 show agreement with

noun class and the numeral 1 also shows agreement with gender. Numbers for counting are the same as the numerals. Oksapmin employs a round-the-body counting system with the nose as the highest point and equivalent to 14, and a total counting unit of 25 (27?). The numbers/numerals from 15 to 25 have a prefix /tan-/ to avoid ambiguity. Numerals consist of the corresponding number suffixed by /-wi/ ~ /-hi/ ~ /-di/. Duna uses a round-the-body counting system with a counting unit of 14. Several languages of the Enga-Huli-Pole-Wiru Family use round-the-body counting with a counting unit of 15 (Huli, Pole), 47 (Kewa, Wiru, Ialibu). Huli and Pole, like Duna above, only use one side of the body. Kewa and Ialibu have the bridge of the nose as the highest point and equivalent to 24, while Wiru has the ridge of the nose (?) as the highest point equivalent to 24.[93] Awin uses an adapted round-the-body system with a counting unit of 33. The solar plexis is the "highest" point (point of symmetry), equivalent to 12. When the total of 23 has been reached on this round-the-body system a further 10 is added by the use of all the toes. On the other hand, Pare has a quinary (pentad, 5-base) system that uses all the fingers and toes. Marind-Kumi counting seems to show some features of the so-called "Australian" system of counting, e.g. 3 = 2 + 1. However, in Marind this is integrated within a quinary system in which the numerals for 5 and 10 contain the morpheme for 'hand' and the numerals for 15 and 20 contain the morpheme for 'foot'.[94] The Awyu languages make use of various types of quinary system. In Syìagha-Yénimu-Oser the numerals for 3 and 4 (and for 8 and 9, 13 and 14, 18 and 19, etc.) are of the "Australian" type (3 = 2 + 1, 4 = 2 + 2); in Pisà the numerals for 3 and 4 are finger names; in Aghu the numeral for 3 is Australian and that for 4 is a finger name. On the other hand, in Dumut a round-the-body system is used. In Kaeti the highest point is the crown which is equivalent to 12, and the total counting unit is 23. Numerals from 13 to 23 have /ei ne/ or /eiga ne/ 'of the other side' preposed. In Wambon the highest point is the nose which is equivalent to 14, and the total counting unit is 27 which is called /kagap/. Numerals from 15 to 27 have /ayam e/ 'the other side' preposed. Numerals from 4 to 27 may be suffixed by /-kup/ 'at'. The Central South Coast counting system seems to be quinary-cum-Australian like Marind. The Mt. Goliath system is a round-the-body one that has the crown as the highest point and equivalent to 14. The total counting unit is 27. Numbers from 15 to 27 have /ton-/ prefixed (cf. Oksapmin above!). The Dani counting system is quinary, with the numerals for 3 and 4 being of the "Australian" type in only some of the Dani languages.

3.5 PRONOUNS

The semantic configurations of the pronouns in various languages are presented below. Where a language has several sets of pronouns, that set having the fullest configuration is presented. The following abbreviations have been used:

1	First Person	i	Inclusive
2	Second Person	e	Exclusive
3	Third Person	m	Masculine
s	Singular	f	Feminine
d	Dual	n	Neuter
p	Plural		

Iwam, Djarok

1s	1d	1p
2s	2d	2p
3ms 3fs	3d	3p

Wogamusin

1s	1d	1p
2ms 2fs	2d	2p
3ms 3fs	3d	3p

Oksapmin

1s	1id 1ed	1ip 1ep
2s	2d	2p
3ms 3fs	3d	3p

Duna

1s	1d	
2/3s	2/3d	1/2/3p visible
		1/2/3p invisible

Enga, Huli

1s	1d	1p
2s	2d	2p
3s	3d	3p

Awyu-Dumut (all languages)

1s	1p
2s	2p
3s	3p

Marind		Yaqai		Boazi	
1s/p		1ms 1fs	1p	1s	1p
2s	2p	2ms 2fs	2p	2s	2p
3ms 3fs	3p	3ms 3fs 3ns	3p	3ms 3fs	3p

Kamoro (Sempan, Asmat similar)

1s	1d	1p
2s	2/3md 2/3fd	2p
	3s/p	

For all of the languages represented above except Boazi, pronoun roots may take suffixes having syntactic significance.

3.6 VERBS

In most of the families the verbs contain affixes to indicate the nature of the subject. The semantic configurations of such subject markers are presented below for all the languages possible.

Upper Sepik: suffixed for subject number, occasionally gender, but never for person;

Oksapmin: suffixed for number only (portmanteau with tense);

Duna: no subject affixes;

Enga Suffixes			Huli Suffixes		
1s	1d	1p	1s	1d	1p
2s	2/3d	2/3p	2s	2d	2p
3s				3s/d/p	

Marind Prefixes		Yaqai Prefixes		Boazi Prefixes	
1s	1p	1s	1p	1s	1p
2s	2p	2s	2p	2s	2p
			3ms/3p		
3s	3p	3fs 3ns		3ms 3fs	3p

Awyu-Dumut (all languages) Suffixes

1s	1p
2/3s	2/3p

Central South Coast Suffixes

1s	1d	1p
2s	2d	2p
3s	3d	3p

In two of the families verbs are affixed to indicate the nature of the object or indirect object: Marind-Kuni by both prefixes and suffixes in the same language and Central South Coast by suffixes.

Negation of verbs is indicated by prefix or preposed particle in Upper Sepik; by postposed particle in Oksapmin; by prefix in Huli and negative auxiliary verb in Enga; by prefix and suffix together in Duna; by suffix, prefix or preposed particle in Marind-Kuni; by suffix in Dumut and Aghu, and by preposed particle in other Awyu languages; and by suffix in Central South Coast.

Tense and aspect are indicated by preposed particles in Upper Sepik, by suffixes in Oksapmin, Duna, Enga-Huli-Pole-Wiru, and by both prefixes and suffixes in Marind-Kuni, Awyu-Dumut, and Central South Coast.

Dependent verbs are affixed to indicate whether the subject of the following verb is same or different in Wogamusin, Enga-Huli-Pole-Wiru, and in Dumut, but not in Duna, Awyu, Marind-Kuni or Central South Coast.

Verb forms analogous to the Mountain-Ok benefactive verb forms occur in Enga-Huli-Pole-Wiru, but not in Upper Sepik or Oksapmin. Partly similar forms occur in Marind-Kuni and Central South Coast.

3.7 SYNTAX

The possessor precedes the possessed (noun) in all the families except Central South Coast, where the possessor follows common nouns. Some kinship nouns take possessive prefixes that show formal similarities to, but usually fewer semantic distinctions than, the pronouns in: Marind-Kuni, Awyu-Dumut except Wambon, Kamoro, and Dani. This phenomenon occurs throughout the languages of Mountain-Ok Division A, but apparently not in the other Divisions of the Ok Family.[95]

Numerals follow the noun in Upper Sepik, Oksapmin, Huli, Awyu-Dumut and Central South Coast, and may do either in Marind-Kuni.

Nouns are co-ordinated by an intonation with pause in Upper Sepik and by a suffix on each co-ordinated item in Oksapmin, Huli, Marind-Kuni and Awyu-Dumut.

The preferred order of syntactic elements within a clause seems to be Subject--Object--Action in all of the language families.

3.8 LEXICOSTATISTICS

The Upper Sepik grouping may well prove to be a stock rather than a family, since shared cognates have been estimated at 15% to 30%. The Left May Family has a lexicostatistical mesh involving from 20% to 70% shared cognates; and if Samo is treated as a sub-family the remaining languages form a chain with linkages above 50% shared cognates. Oksapmin dialects all share over 85% cognates. The languages of the Enga-Huli-Pole-Wiru Family share 28% to 50% cognates.[96] The Awin-Pare Family exhibits relationships of 36% and above. The relationship between the Marind and Kuni Sub-Families is indicated by 20% shared cognates, while the relationships within each Sub-Family are in the vicinity of 50% shared cognates. The percentage of cognates shared by the Awyu and Dumut Sub-Families ranges between 20% and 30%, whereas the figures within each Sub-Family range between 50% and 70%. The languages of the Central South Coast Family share from 45% to 70% cognates.

A certain amount of lexical similarity is observed between several of the language families, and in some cases quite a considerable amount of borrowing seems to have occurred between individual languages across a family boundary. For instance, though Upper Sepik and Left May have virtually no lexical similarity as families, yet Apaka shows 10% possible cognates with Iwam. Duna shows about 15% cognates with the Enga-Huli-Pole-Wiru Family in general, but 25% with Huli in particular. These two families are tentatively regarded as both belonging to the East New Guinea Highlands Stock.[97] In Table 9 Oksapmin shows 17% possible cognates with Bimin, an average of 7% with the other languages of the Mountain-Ok Sub-Family, and an average of only 3% with languages of the Lowland-Ok Sub-Family. These figures show exactly the characteristics to be expected if it is posited that Oksapmin is genetically unrelated to the Ok Family and that within the past millenium or so it has borrowed heavily from Bimin.[98] Awin shows about 10% possible cognates with the Ok Family and with the Awyu-Dumut Family, but more detailed investigation is necessary before regular sound correspondences can be established. In Table 9 the two Dumut languages show an average of 6% cognates with the Ok Family with the highest figures in the Lowland-Ok Sub-Family. A comparison of Drabbé's Awyu word lists with those for the Ok languages in Tables 6 and 7 indicates an average of 10% probable cognates with the highest figures in the Mountain-Ok Sub-Family. It is the author's impression that a close study of the Awyu materials

would demonstrate regular sound correspondences between the Awyu (or Awyu-Dumut) proto-forms and Ok proto-forms. It may eventually prove possible to demonstrate that the Ok, Awin-Pare, and Awyu-Dumut Families belong to a single linguistic stock or phylum, or perhaps that there was extensive borrowing between the three parent languages of these families. The possibility of significant lexical similarities between Awyu-Dumut and Central South Coast also warrants investigation. A rough count gives 7% possible cognates. The scanty material from Mt. Goliath shows an average of 10% possible cognates with the Ok Family in Table 9. However, after a superficial check of other materials of this family against Sibil, Bromley states in a private communication that they appear unrelated. More material from several languages of the family represented in the Mt. Goliath word list would be necessary to clarify the situation.

4. CONCLUSION

Certain of the features of the languages examined in this chapter are of little use in determining family groupings of languages, because they occur so frequently throughout large areas of New Guinea. For instance: small size of the phoneme inventory, the occurrence of noun-noun compounds, the use of a round-the-body system of counting, the occurrence of syntactically significant suffixes on pronouns, suffixation of verbs for tense, the possessor preceding a possessed noun, possessive prefixes on kinship nouns, and the preferred sequence Subject--Object--Action in clause structures.

Other features are of little taxonomic value because they are so variant from language to language even within families. For instance: the type of syllable preferred, the technique of negating verbs, and the way of marking tense.

On the other hand, those features which have only a moderate degree of variation from language to language provide the most useful criteria for classifying languages. In the present study, the following features occur throughout the languages of the Ok Family with only minor variations, and do not occur in neighbouring families with any consistent pattern:

(a) a two-gender system (many Ok languages still need checking for this, but it seems likely that they have it because of the gender distinctions in the pronoun system);

(b) pronouns and subject suffixes with the semantic configurations:

1s	1p
2ms 2fs	2p
3ms 3fs	3p

1s	1p
2s	
3ms 3fs	2/3p

(c) object prefixes with some transitive verbs;

(d) the occurrence of benefactive verb forms;

(e) lexicostatistical relationships between languages within the family consistently above 20% shared cognates, based upon regular sound correspondences.

Several other features are common to all the Ok languages, but insufficient information is available to show the contrast with neighbouring families, such as the tendency not to mark common nouns for plurality, the occurrence of "duplex" stems, and the marking of noun co-ordination by suffixes or postclitics on each co-ordinated item.

Different features may prove to be the most useful for establishing the coherence of other families. For instance, the Awyu-Dumut Family is characterized by: (a) the semantic configuration of the pronouns, and (b) of the subject suffixes, (c) other details of the conjugation not discussed in this section, and (d) lexicostatistical relationships exceeding 20% shared cognates with prospects of establishing regular sound correspondences. The distinction between the Awyu and Dumut Sub-Families is best correlated with the phonemic status of stress, the occurrence of /x/ or /g/, and the type of number system.[99]

Some features, though too variant to use as evidence for the identification of families, may nevertheless be sufficiently stable to identify sub-families or divisions within a family. Thus, the occurrence of lexical pitch and specific phonemes such as /f/, the general type or finer detail of the particular counting system in use, and the occurrence of separate punctiliar and continuative verb stems serve to distinguish the Lowland-Ok and Mountain-Ok Sub-Families.[100]

The cumulative evidence summarized above demonstrates the real existence of a family grouping of languages here called Ok. As well as showing the general coherence and internal sub-divisions of the Ok Family, this evidence also shows the contrast between the Ok Family and its neighbours. For a better understanding of the Ok Family as a whole, more field study of Mianmin and Ninggirum and more information on the Ngalum "dialects" are needed.

NOTES

1. Clan is here used in the popular sense in which it has often been applied to such descent-cum-residence groups in this area. Mrs. R. Craig of the Department of Anthropology, University of Sydney, prefers to call these groups parishes.

2. This Atbalmin estimate of 1963 is less than the earlier estimate of 5,000 in the 1960 Village Directory.

3. McCarthy 1963; Brongersma and Venema 1962: 130, 133.

4. An account of the ancestry of this informant was communicated by Rev. K. Bricknell of the Australian Baptist Missionary Society.

5. Private communication from Assistant District Officer D. Fitzer, based on hearsay reports.

6. Private communication from R. Loving of the Summer Institute of Linguistics.

7. Private communication from A.F. Lockhart of the Unevangelized Fields Mission; Brongersma and Venema 1962: 156-7.

8. Private communication from F.C. Horne of the Unevangelized Fields Mission; Brongersma and Venema 1962: 157.

9. Brongersma and Venema 1962: 148.

10. Anonymous 1964; Reynders 1962.

11. Brongersma and Venema 1962: 305-7; Kooijman 1962; Galis 1960: 136; also personal communication from J. Pouwer.

12. The author's population estimates for Southern Kati are based on Schoorl 1957: 12.

13. Patrol Officer R. Henderson mentions in private communication that the Kowan live in the villages of Kuem and Mabaduan, and that they maintain they are migrants from the north-west.

14. Drabbé 1954: 146-229.

15. Geurtjens 1932: 397-433.

16. Austen 1923 (a): 162.

17. Drabbé 1954: 146-229.

18. Austen 1923 (a): 161.

19. Schoorl 1957: 284-9.

20. Brongersma and Venema 1962: 130, 133; Reynders 1962: 48, 51-54; see also map in Schoorl 1957: 299.

21. Brongersma and Venema 1962: 117, 128.

22. Schoorl 1957: 11.

22a. Austen 1926: 75, list number 2.

23. The author takes full responsibility for his way of presenting Steinkraus' phonemic analysis of Tifal, and for his re-analysis of Drabbé's phonological statements on Southern Kati and Northern Kati.

24. The absence of /s/ from some Lowland-Ok languages (and also from many Australian Aboriginal languages) disproves the suggestion that sibilants are a universal feature of phoneme inventories, made by Burt and Aginsky 1948: 170.

25. Pike 1947: 3-11.

26. The author is uncertain about the pronunciation of initial orthographic ng. Geurtjens gives ngéam 'wrist protector' and ngorom 'rubbish', 'dirt' for Digoel, and Kooijman gives ngobip 'Jew's harp' for Sibil.

26a. The usual noun clitic is /-te/ or perhaps /-Vte/ as may be seen in Tables 6 and 7.

27. Contrasts between /t/ and /r/ are given for Bimin, Mianmin, and Northern Kati, since these parallel the /t/ - /d/ contrast of the other languages so closely.

28. Steinkraus mentions intervocalic /d/ but gives no examples, in Steinkraus 1962: 13.

29. Lexical pitch has been analyzed for Tifal and Teléfól, and partly analyzed for Mianmin. On words of these three languages tonemes are indicated whenever they are known. Pitch is not indicated for other languages because the data are not sufficiently reliable in this regard.

30. This is the only observed occurrence of indigenous monomorphemic intervocalic /d/ in Teléfól.

31. This is the only occurrence of initial /r/ in Drabbé's list of over 400 words.

31a. Addenda to NN:

/gidoŋ/	'fish spear'	/kidoŋ/	'fourteen'
/gaut/	'caterpillar'	/kaun/	'heavy, hard'

32. Drabbé 1954: 151-2.

33. Healey 1964 (b), sections 2.2 and 6.2.

34. /lempeŋ/ may be a borrowing from Malay /lempeŋ/ 'wafer'.

35. Brongersma and Venema 1962: 94.

36. Steinkraus 1962: 11, 12.

37. Doubt is cast on the length contrast in NS by /bokam/, /bokaam/ 'men's house'. However, in a private communication C.F. Horne vouches for the contrastive nature of vowel length in Ngalum in the Kiwirok area.

38. For more Tifal examples see Steinkraus 1963: 2-4.

39. For more Teléfól examples see Healey 1964 (b).

40. A moredetailed exposition of Tifal tonal sandhi is given in Steinkraus 1963: 5-8.

41. For a detailed exposition of Teléfól tonal sandhi see Healey 1964 (b), sections 9.3 to 9.5.

42. Drabbé 1954: 153. The term "accent" is used for Drabbé's toon.

43. Wurm 1954: 702.

44. Kent 1954: 16.

45. Healey 1964 (b), section 1.

46. Such a selection may be illustrated by Teléfól, in Healey 1964 (b), section 3.1.

47. The consonant cluster /ng/ constitutes an orthographic problem in any language in which the digraph ng is used to represent /ŋ/. To maintain phonemic contrast in the orthography it is necessary to represent /ng/ by n-g, ñg, or some similar device. For example, Ninggirum /niŋi kwoo/ 'tooth', /kenge/ 'tree sp.', /tina miŋgi/ 'grandchild' may be orthographically: ningi kwoo 'tooth', ken-ge 'tree sp.', tina minggi 'grandchild'.

48. Healey 1964 (b), section 6.2.

49. Drabbé 1954: 155-6; Phyllis M. Healey 1964 (b), section 2.16.

50. Drabbé gives several examples of Kati compounds. Drabbé 1954: 153-5.

51. The earliest account of Mountain-Ok Division A counting was given in Kirschbaum 1938.

52. Information on Sibil counting from Galis 1960: 136. See also Brongersma and Venema 1962: 85-6.

53. Drabbé 1954: 201-3.

53a. Galis 1960: 131. See also *asu in thesis chapter III, 209 notes.

54. In Teléfól the forms for 'he/it' and 'they' are homophonous in the main set of pronoun roots, but are distinct in the emphatic set of roots.

55. Details of the meaning and syntactic significance of the Teléfól pronoun suffixes are given in Phyllis M. Healey 1964 (b), section 2.16.

56. An elaborate classification of Teléfól verbs on the basis of stem differences is to appear in Alan Healey, Teléfól Morphology.

57. Kati information from Drabbé 1954: 197-8.

58. This analysis of Teléfól dependent endings may be illustrated by /-nala/ = /-n/ 'same subject' + /-ala/ 'he'. An alternative analysis is presented in section 6.4 of Healey 1964 (b), which involves vowel harmony between the two suffixes: /-nala/ = /-nal/ 'same subject' + /-a/ 'he'.

59. The benefactive form of a transitive verb may have two syntactic "objects" (namely, the object and the beneficiary which Drabbé calls the relation), and may be regarded as bi-transitive. However the benefactive form of an intransitive verb may only have one syntactic "object" and cannot properly be called bi-transitive. Nor can it be called transitive lest it be confused with the non-benefactive form of a transitive verb. For these reasons "benefactive" has been adopted as the sole name for these verbal forms in this paper.

60. Drabbé 1954: 167.

61. Kati examples of this range of meanings of the benefactive are given in Drabbé 1954: 167-8.

62. In Teléfól at least, there are benefactive equivalents of all the kinds of clause listed, but the Transitive Benefactive is the most frequent kind.

63. The analysis of Kati postpositions as possessed nouns seems preferable to Drabbé's view of them as adjectives, since this agrees with their nominal status when they occur as destination of a verb of motion.

64. Throughout section 2.8 "cognate" is used in the sense of "lexicostatistical same" or "probable cognate".

64a. The indigenous stone implements used throughout the Ok-speaking area are adzes, though often called axes.

65. For a discussion and more examples of these types of probable cognates see Alan Healey, Reconstructing Proto-Ok, Section 4 (mimeo 1964).

66. The only published discussions seen are: Morris Swadesh's rules in Bergsland and Vogt 1962: 145; Gudschinsky 1956: 182; Taylor and Rouse 1955: 106-7 (implications rather than discussion).

67. Some compounds in Tables 6 and 7 are written as two words, just as they are in the source material. Probably this sometimes represents phonological juncture, and sometimes merely the bi-morphemic nature of the compound.

68. These criteria are put forward as an attempt to extend to compounds the long-accepted policy of neglecting inflectional (and derivational?) affixes and processes when deciding cognateship of words. See Gudschinsky 1956: 182 and Swadesh in Bergsland and Vogt 1962: 145.

69. Nida 1961: 319 suggests as a more basic measure the number of words for which this morpheme may substitute semantically.

70. In these circumstances the author disagrees with Swadesh's (loc. cit.) policy of using either part of the compound indifferently for making cognate decisions.

71. Gudschinsky's (loc. cit.) analysis of the Ixcatec and Mazatec words for 'guts' as non-cognate fit into this category well.

72. A similar finding for Uto-Aztecan languages is reported by David H. Kelley in: Hymes 1960: 10.

73. For a given meaning in Table 6 all of the 28 numbers in that particular column were punched serially on a single IBM card, two digits being allotted to each number. A separate card was punched for each of the 50 meanings (columns) in Table 6. For Table 7 zeros were inserted for the 13 languages not listed, and 28 numbers were still punched on each card. The IBM programme was written by P. Tindale of the Department of Theoretical Physics at the Australian National University, where it is kept on file as Programme 453. The last card of the programme contains just two numbers in sequence -- the number of languages being compared and the number of meanings (cards) being used in the comparison.

74. The author joins commentators Ellegard, Fodor, Hymes, Milewski, Milke, and Taylor in disagreeing with Bergsland and Vogt's claim (op. cit. p.126) that "in principle, the lexicostatistic method is ... unreliable for determining the sub-grouping of cognate languages and dialects".

75. A discussion of biasing due to incomplete word lists is found in Thomas and Healey 1962: 29. Clearly, such biasing may occur with the Swadesh 100-item test list which constitutes 3/4 of the list used in the present study, since its items still show considerable heterogeneity of persistence.

76. Dyen 1956.

77. Swadesh 1954: 326; Dyen 1963(b); Wurm and Laycock 1961: 133. The latter deliberately emphasize intelligibility rather than shared cognates. However, their examples imply that, in the absence of direct information on intelligibility, a standard of about 60% shared cognates could be substituted for their recommended standard of 50% information transfer.

78. The grouping of languages into "families" follows the various groupings, usually of undefined status, mentioned in Capell 1962, supplemented by mapping information from the sources he quotes. The families in the south-western quarter of the region are based on the present author's personal assessment of the published data listed in section 3.1 following. In the absence of grammatical information, languages were grouped into the same family if their basic vocabulary showed more than 20% of shared cognates. In addition, information has been received by personal communication from D.C. Laycock, R. Loving and J. Bass of the Summer Institute of Linguistics, R. Conrad of the S.I.L., and H.M. Bromley of the Christian and Missionary Alliance. Also K. Dennis of the U.F.M.

79. The population estimates in this section are taken from Capell 1962, Galis 1955-6, Kooijman 1959, and Drabbé 1959: 4.

80. Capell 1962: 46-7, and Laycock in personal communication.

81. Personal communication from R. Conrad. The grouping into languages is based on the author's analysis of Conrad's lexicostatistical data.

82. Information on Oksapmin used in this section comes from the author's field notes and from personal communications from Rev. K. Bricknell of the Australian Baptist Missionary Society.

83. Capell 1962: 111, 117, and personal communication from R. Brown of the Summer Institute of Linguistics. Also, Wurm 1964 (a): 16, 1964 (b).

84. Capell 1962: 105-128; Wurm 1961, 1964 (a), 1964 (b); Rule 1954; and the author's field notes.

85. Word list supplied by courtesy of Patrol Officer R.W. Henderson.

86. Murray and Ray 1918.

87. Boelaars 1950: 1-18, 55-67. Some information also taken from Drabbé 1954: 69-145, 1955; Geurtjens 1932.

88. Many of Drabbé's "dialects" are here regarded as separate languages so as to keep a uniform standard of nomenclature throughout. The sources for this family include Drabbé 1950, 1957, 1959; Nevermann 1940; Boelaars 1950: 68-76; and personal communication from Dr. D.C. Gajdusek concerning Mitak.

89. Drabbé 1953; personal communication from Dr. D.C. Gajdusek concerning Neferipi and Tjitjak.

90. de Kock 1912: 169-170 has a short word list which has been published on four different occasions. His is the fullest version and appears to be the most accurate. Salzner 1960: map 48, calls this language Spe, but gives no indication of the source of this name. A more recent expedition to this area apparently obtained no extensive linguistic information. Sneep 1961-2; Saulnier 1963. In a personal communication H.M. Bromley states that the languages spoken in the Valley-of-the-70, T-Valley and the Erok Valley are all related.

91. Bromley 1961, and in personal communication.

92. Allomorphic alternation between word-final [V] and word-medial [Vn] supports this analysis. Drabbé 1950: 113, 1957: 21.

93. Franklin 1962: 189; Rule 1954: 28.

94. See Galis 1960 for information on Marind numerals and on the classification of counting systems.

95. A description of Teléfól possessive prefixes is given in Alan Healey 1962: 20.

96. Wurm 1961: 22.

97. Wurm 1961: 23, 1964 (a), 1964 (b).

98. The lexicostatistical characteristics of borrowing are discussed in Thomas and Healey 1962: 27-9; Dyen 1963 (a).

99. Although Drabbé at first thought that the Dumut group was "probably a sister language of ... Kati", he eventually decided that it "is very closely related with its western neighbour [Awyu] and only superficially with its eastern one [Kati]". He bases his decision on (a) the greater positive similarity of vocabulary and verbal conjugation between Dumut and Awyu than between Dumut and Kati, and (b) the negative similarity of Dumut and Awyu in not having the gender, verbal object prefixes, aspect associated with tense, and senary numeral system of Kati, despite (c) the greater similarity between the phonologies of Dumut and Kati than between those of Dumut and Awyu. Drabbé 1954: 211; 1959: 5. The quotations are the present author's translations from Dutch.

100. It seems likely that a world-wide sampling would indicate that various language features have different "persistence scores". An ideal test list of features to be used in classifying languages at the family level would avoid the highly stable and extremely unstable features, but employ rather those of medium persistence. Any serious attempt to use typology or morphostatistics to help classify languages must take into account the relative probability of occurrence or non-occurrence of each of the positive and negative features considered.

RECONSTRUCTING PROTO-OK

Alan Healey

0. INTRODUCTION

It is the purpose of this paper to show that the methods of comparative linguistics may be used to discover regular sound correspondences between the languages of the Ok Family of New Guinea.[1] This leads to a tentative reconstruction of most of the phones and a few of the morphemes of the parent languages. Most attention is given to reconstructing Proto-Mountain-Ok, since this sub-family is better documented. To clarify the status of Sibil, it is excluded from these PMO reconstructions, and compared with PMO later. A less extensive study of the Proto-Lowland-Ok is limited by lack of data from Ninggirum. Then some of the more interesting facets of Proto-Ok are arrived at by a comparison of PMO, Sibil, and PLO.

The language data quoted in this paper come from a variety of sources as mentioned in "A Survey of the Ok Family of Languages", section 1, and have all been phonemicized according to the phonemic descriptions presented in the "Survey", sections 2.1-2.4, especially Tables 1 and 2. This present paper was written after the "Survey" was completed, and occasional discrepancies of phonemic transcription and cognate decision occur between the two papers, but these do not materially affect any of the conclusions of either paper.

Whenever there is ambiguity in the proto-form of a particular morpheme, this is indicated by two (or occasionally three) proto-forms listed together. These represent all possible combinations of the various proto-phones by which they differ, e.g. 218 *fuk, *FUK 'neck' represents uncertainty to the extent of 8 possible reconstructions: *fuk, *fuK, *fUk, *Fuk, *FUk, *fUK, *FuK, *FUK. A hyphen initiating or terminating a proto-form indicates that the morpheme was probably bound in the parent languages. A hyphen is placed after most reconstructed verbal stems, and the data supporting reconstructed verbs is usually presented in the same form. Two dots initiating or terminating a proto-form indicate complete uncertainty as to the nature of that portion (if it be a portion) of the original morpheme. A hyphen within a proto-form marks a probable morpheme division.

Reconstructing verbs has proved quite difficult because of (a) the sporadic way in which the stem-suffix boundary is marked in much of the source material, (b) the multiplicity of stem allomorphs, especially in the Mountain-Ok languages, and (c) the lack of information on aspect suffixes and their allomorphs in the Mountain-Ok languages.[2] Many more verbs may be reconstructed when such grammatical information is available for all of the source material.

Throughout this paper contrastive vowel length is assumed to exist in all of the parent languages because of its near-universality in the daughter languages. No attempt is made to reconstruct length rigorously since vowel length has not been adequately indicated or checked in several of the languages. Instead, length has been reconstructed wherever it appears in the more reliable data. (It is assumed that errors of phonetic transcription are more likely to involve writing length short than vice versa.)

A sound correspondence is regarded as established for a given position within the word if there are at least 3 reasonably good examples of it.[3] All reconstructed forms are prefixed by an asterisk. English and Dutch meanings are given for each reconstruction. The Dutch forms are not always the preferred translation equivalent of the English, but rather those found in Geurtjens' and Drabbé's word lists.

1. PROTO-MOUNTAIN-OK

The established sound correspondences for the Mountain-Ok languages (excluding Sibil) are listed in Table 1 in the phonemic transcription of the individual languages and the best available examples are listed by their Table 3 reference numbers. In this table *b-, -*b-, and -*b represent *b in word-initial, intervocalic, and word-final positions respectively. For the vowels, I, F, and M represent occurrence in an initial syllable, final syllable, and monosyllable respectively. Table 2 lists most of the examples that involve sound correspondences that are not yet established (by three good examples).

A list of 406 morphemes tentatively reconstructed for PMO is given in Table 3. Morphemes numbered from 1 to 211 are considered as reasonably good reconstructions, since they are based upon cognates in 4 or 5 languages, or in 3 languages including MN and BM. Reconstructions numbered from 212 to 405a are not as reliable, since they are based on cognates in (a) any 3 languages; (b) any of the following pairs of languages: MN-FA, MN-TF, MN-BM, BM-TF, BM-TL; (c) any pair of languages at all if they illustrate a rare sound correspondence; or (d) any single language if there is a cognate in a non-contiguous language of the Lowland-Ok Sub-Family.

The notes accompanying the first 211 reconstructions are placed at the foot of the page and bear the same number as the reconstructions to which they apply. They include: (a) additional cognates introduced by "Also"; (b) an anticipated form in parentheses introduced by "Expected" for an unusual sound correspondence; (c) the full compound or phrase (introduced by "From") from which the listed hyphenated form has been taken -- verb stems excepted; (d) any meaning deviating from that given for the reconstruction, introduced by "Note" and indicated in the list by (+).

No attempt has been made to reconstruct tone for lack of information, but many tonal parallels between MN, TL, and TF are obvious in Table 3. Nor has any attempt been made to account for Mianmin /q/.

The PMO symbols with asterisks in Table 1 represent proto-phones, and these require phonemic analysis before proto-phonemes may be postulated. From a consideration of the present-day languages of the Mountain-Ok Sub-Family, the following proto-phones seem worthy of particular attention: *l-:*d-:*g-; *t-:*c-:*k-:*K-; -*k:-*K; *f-:*F-; *u:*U; *ë:*Ë:*a; *H:*a.

There is a clear contrast between *d and *g, and these both appear to contrast with *l:

*laa- 113	*daal 318	*gaal 175
*lɔŋ 311	*dɔl 168	*gUl 69, *gool 130
*leib 206	*deeŋ 210	*geeŋ 73
	*dindin 358	*gimgim 340

The phone *c is very nearly in complementary distribution with each of *t, *k, and *K. All examples of *c are followed by *i, *ii, or *I except items 5, 131, and 178. On the other hand *k and *K are never followed by these three vowel phones and *t is followed by these vowel phones in only four items: 55, 125, 337, and 354. All three of *t, *k, and *K appear to contrast with each other:

*tool 165	*koon 4	*KooK 373
*tuum 164	*kun, *kuum 48	*Kul 236
*tawaal 156, *tIlis 125	*kaleel 92	*Kaliim 344
*teiŋ, *taiŋ 323	*kein 107	

However, because of the paucity of examples and because their reflexes contrast in only one language (MN), the relationship between *k and *K is worthy of further investigation. Perhaps MN has two strata, one of which may be related to the heavy borrowing from TL posited in the "Survey", section 2.8.

A comparison of final *k and *K shows them to be in contrast:

*muuk	16	*suuK	348
*sook	114	*KooK	373
*laek	292	*naiK	271

Again, these contrast in only one daughter language (MN), and a hypothesis of two strata in MN should be investigated.

The data containing initial *f and *F are insufficient for a satisfactory conclusion to be reached. However, it may be noted that *uu seems to follow *F rather than *f, and this has a parallel in present-day Mianmin, where /f/ is followed by /a/, /o/, /u/, /i/, and /h/ is followed by /e/, /a/, /o/.

The present data for *u and *U are not comparable for any given syllable position. The present data for final *ɘ, *Ë, and *a are insufficient for a firm conclusion to be reached, but give the impression of contrast.

The vowel phones *a and *ä appear to contrast in word-initial position, which is the only place in which *ä occurs:

*asU	209	*ätul	171
*afaan	40	*ätaan	154
*abiil	153	*äbiib	101
*abin	23	*äbiin	100
*aKeet, *aŋkeet	19	*äŋkË-	104

However, *ä may eventually prove to be a tonally conditioned variant of */a/.

Vowel phones *I and *A are also limited to occurring in the initial syllable, and probably reflect a type of vowel neutralization similar to that of Teléfól.[4]

The apparent contrasts discussed above suggest a PMO phonemic system much more complex than any of the daughter languages, and such a system is suspect because of this discrepancy. Rather more information is required for a thorough phonemic analysis of Proto-Mountain-Ok. For instance, when comparable data are available from WG, when vowel neutralization is understood in each Mountain-Ok language, and when PMO tone has been reconstructed for all proto-morphemes in Table 3, PMO phonemes may be delineated with more certainty.

TABLE 1. ESTABLISHED SOUND CORRESPONDENCES OF MOUNTAIN-OK LANGUAGES

PMO	MN	TL	TF	FA	BM	Illustrations
*b-	p	b	b	b	b	9, 35, 45, 133, 157, 180, 188
-*b-	p	b	b	b	b	1, 23, 61, 100, 101, 153, 176
-*b	p	b	b	b	b	18, 54, 112, 155, 190, 198, 206
*t-	t	t	t	t	t	28, 44, 59, 164, 184, 186, 190
-*t-	t	t	t	t	t	7, 15, 99, 102, 150, 154, 171
-*t	t	t	t	t	t	20, 41, 47, 119, 122, 160, 183
*d-	r	d	d	d	r	3, 126, 168, 197, 210, 212, 225
*l-	r	il	l	l	r	57, 70, 113, 206, 292, 311, 326
-*l-	r	l	l	d/l	r	17, 55, 83, 92, 178, 186, 208
-*l	r	l	l	l	r	27, 38, 50, 69, 92, 133, 153
*g-	g	d	d	g	g	1, 24, 42, 69, 71, 130, 175
*k-	ø	k	k	k	k	4, 21, 48, 51, 92, 107, 249
-*k-	ø	k	k	k	k	56, 179, 180
-*k	ø	k	k	k	k	16, 114, 138, 158, 243, 252, 370
*K-	k	k	k	k	k	31, 74, 102, 204, 220, 230, 233
-*K	k	k	k	k	k	46, 79, 84, 89, 115, 189, 197
*k^w-	k^w	k^w	k	k^w	k^w	119, 147, 224, 256, 359, 405a
*c-	k	t	t	k	k	5, 6, 88, 105, 129, 146, 178
*m-	m	m	m	m	m	16, 17, 20, 33, 50, 145, 198
-*m-	m	m	m	m	m	21, 30, 31, 62, 79, 121, 142
-*m	m	m	m	m	m	49, 57, 97, 103, 118, 123, 129
*n-	n	n	n	n	n	12, 25, 90, 91, 138, 201, 271
-*n-	n	n	n	n	n	32, 77, 78, 94, 108, 148, 185
-*n	n	n	n	n	n	4, 6, 9, 17, 30, 40, 44
-*ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	26, 28, 37, 42, 45, 60, 66
*w-	w	w	w	w	w	60, 96, 120, 135, 289, 300, 310
-*w-	w	b	w	w	w	124, 141, 156
*y-	y	y	y	y	y	34, 103, 118, 122, 183, 281, 335
*f-	h	f	f	f	f	11, 41, 68, 89, 111, 170, 177
-*f-	f	f	w	b/w	w	40, 66, 87, 243, 249, 299
*F-	f	f	f	f	f	64, 106, 172, 179, 322, 371
-*ŋk-	k	k	k	k	ŋ/ŋg	13, 44, 80, 104, 144, 181, 398

TABLE 1. (cont.)

PMO		MN	TL	TF	FA	BM	Illustrations
*s-		s	s	s	s	s	81, 95, 114, 123, 144, 162, 199
-*s-		s	s	s	s	s	63, 166, 209, 250, 252, 258, 276
-*s		t/s	t	s/t	s/t	s	80, 96, 125, 127, 131, 257
I	*a	a	a	a	a	a	40, 92, 142, 153, 155, 159, 180
F	*a	a	a	a	a	a	15, 44, 243, 252, 365, 376, 395
M	*a	a	a	a	a	a	97, 191, 391
I	*aa	a	aa	aa	aa	a	67, 83, 111
F	*aa	a	aa	aa	aa	aa	30, 40, 144
M	*aa	a	aa	aa	aa	aa	51, 120, 175, 190, 197
I	*ɨ	ø	a	a	a	a	62, 100, 101, 104, 150, 154, 171
I	*A	a/i	a/i	a/i	a/i	a/i	44, 47, 144
I	*I	i/a	i/a	i/a	a/i	i/a	22, 125, 166
I	*i	i	i	i	i	i	79, 94, 117, 181, 202
F	*i	i	i	i	i	i	23, 129, 173, 188, 189
M	*i	i	i	i	i	i	135, 146, 157, 195, 199
F	*ii	i	ii	ii	ii	ii	22, 100, 101, 108, 150, 153
M	*ii	i	ii	ii	ii	ii	6, 26, 49, 86, 90, 112, 193
F	*u	o	u	u	u	u	45, 159, 171, 265
M	*uu	o	uu	uu	uu	uu	16, 43, 123, 138, 164
I	*U	u	u	u	u	u	63, 102, 185, 204
F	*ee	e	ee	ee	ee	ee	19, 31, 50, 54, 92, 124, 166
M	*ee	e	ee	ee	ee	ee	38, 60, 73, 91, 145, 184, 198
F	*ɘ	e	a	a	a	e	47, 61, 83, 121, 126, 249
F	*Ë	a	a	a	a	e	32, 65, 78, 104, 142
F	*oo	ɑ	oo	oo	oo	oo	1, 139, 148, 221, 277, 333, 370
M	*oo	a	oo	oo	oo	oo	9, 27, 103, 114, 158, 170, 211
M	*O	a	a	ɑ	o	o	68, 118, 168, 311
M	*ei	ei	ee	ii	ai	ai	107, 119, 206, 228, 289, 353, 361

TABLE 2. MOUNTAIN-OK SOUND CORRESPONDENCES NOT YET ESTABLISHED

PMO	Illustrations
-*K-	151, 231, 383
-*ŋ-	334
*g^w-	14
*c^w-	26, 193
*C-	47, 67
I *ii	377
I *u	21, 45, 232, 265, 282
M *u	48, 236
F *uu	5, 115
F *U	21, 204, 209, 230, 332
M *U	69, 294
I *UU	106, 339
F *UU	151, 339
M *UU	18, 42, 296
I *e	50, 342
I *ɘ	17, 31, 126, 272, 329
M *ɘ	85, 133, 261
F *ɘɘ	3
M *Ë	28, 39
I *ɨ	332
F *ɨ	33, 99
M *ɨ	134, 327, 356
M *ɨɨ	172
F *O	79
I *o	5, 74, 333
I *oo	151

Semivowels that fuse with vowel:

*y-	30, 80, 121, 122, 281
*w-	32, 36, 37, 53, 76, 78, 99, 115, 116, 140, 306
-*w-	46, 84, 122, 143, 281, 386

Consonant clusters other than *ŋk:

10, 41, 47, 65, 128, 129, 159, 192, 230, 248, 257, 328, 329, 330, 380

Diphthongs other than *ei:

24, 36, 37, 59, 70, 81, 130, 131, 132, 136, 147, 238, 239, 240, 262, 271, 279, 280, 292, 321, 347, 357, 402

TABLE 3. PROTO-MOUNTAIN-OK RECONSTRUCTED MORPHEMES

No.	PMO	English Dutch	MN	TL	TF	FA	BM
1	*gaboom *gOboom	head hoofd	gapạm	dùboóm	dàboòm	guboom	—
2	*guu	head hoofd	go-	dùú-	du-	gu	—
3	*dabɵɵl	forehead voorhoofd	riper	dàbaál+	dàbaàl	dabaal+	yabaar
4	*koon	hair, leaf haar, blad	ạ̀n	kòón	koon	k^{w}oon koon	koon
5	*coluun	ear oor	koron	tùluún	—	kaluun	karuun
6	*ciin	eye oog	kìn	tìin	tiìn	kiin	kiin
7	*mutuum *mUtUUm	nose neus	—	mútuúm	mútúm	mutuum	mutuum
8	*iin	nasal mucus snot	—	ìín	in-	iin	iin

1 Also WG /kawom/.

2 Also WG /ko-kim/ 'head-louse', KW /guu/ 'head'. From MN go-kim/ 'head-louse', TF /dú-tùkùl/ 'bald', FA /gu-tukul/ 'bald', these latter being compounds of 'head' and 'fat'. Note TL 'core' (of boil) and 'ridge' (of house).

3 FA /gubaal/ 'brain' may be a by-form, or it may be a compound involving *guu 'head'. Expected BM (dabaar). Note TL 'skull', FA 'face'.

4 Also KW /k^{w}oon/, /koon/, WG /an/.

5 Also WG /kadan/, /kon/.

6 Also KW /kiin/, WG /kin/.

7 Also probably KW /mutu/.

8 From TF /in-ook/ 'nasal mucus'.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
9	*boon	mouth, jaw mond, kaak	pə̌n-	bòóń-	boón-	boon-	boon-
10	*fiil-kaal *Fiil-kaal	lip lip	--	fìì-kaàl	fiìl kaàl	fil-kaal	fiir-kaar
11	*fooŋ	tongue tong	hə̌ŋ	fòóŋ	--	--	fooŋ
12	*niŋ *niiŋ	tooth tand	níŋ$^{+}$	níŋ$^{+}$	--	--	niiŋ
13	*aŋkO.. *ɯŋkO.. *ëŋkO..	molar kies	--	àkák	áká	aka	aŋgoob
14	*g^{w}eel	throat keel	-- $^{+}$	dèèl-	deèl-	geed-	g^{w}eer^{+}
15	*gitak *gitaK	nape, neck nek, hals	--	dìtàk	dìtàk	getak	ritak
16	*muuk	breast borst, uier	mə̌	mùúk	muúk	muuk	--

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9 From MN /pan-on/, TL /bòón-kún/, TF /boón-duùk/ 'chin'; TL, TF, FA, BM /boon-teem/ 'mouth'; TL, TF /boon-koon/ 'whiskers'

10 Presumably *fiil, *Fiil means 'lip', since *kaal 'skin' (51) frequently occurs as second element in compounds relating to body parts.[5]

11 Also WG /han/, /ha/.

12 Note MN 'thorn', TL '(arrow) barb'.

13 The final consonant may be determined by data from WG and KW.

14 MN /k^{w}e-goŋ/ 'Adam's apple' seems an improbable cognate; one would expect perhaps (g^{w}er). From TL, TF /deel-teem/ 'throat'; FA /geed-uk/ 'Adam's apple'. Note BM 'neck'.

15 Also WG /kate/, KW /getak/. Expected FA (gitak), BM (gitak).

16 Also KW /muuk/.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
17	*mɘ̈lɘ̈n	rib rib	meren+	màlán-	málán-	madan-	maran-
18	*tUUb	breast-bone borstbeen	túp-òn	tùb-kún	tuùb-kún	tuub-kun	--
19	*aKeet *aɡkeet	heart hart	ąkep-	àkeèt+	akeet	akeet+	--
20	*mat *mUt	belly buik	màt+	mát	mat	mat	muut+
21	*kumUn	bulge uitpuilen	amun	kùmún	kumun	kumun	kumun
22	*mAlii	side zijde	--	mìlií	malii	madii	mari
23	*abin	navel navel	apin	àbín+	ábín	--	abin-
24	*gael *geil	kidney nier	geir	dàl	--	gil	geer

17 From TL /màlán-kún/, TF /málán-kún/, FA /madan-kun/, BM /maran-kun/ 'rib'. Note MN 'side of body'.

18 Presumably *tuub means 'breast-bone', but like many body-part morphemes, it normally occurs in a compound with *kun 'bone', 'bony' (48).

19 From MN /akep-mit/ 'colon' - (final /p/ by assimilation from /t/?). Note TL 'thoughts', FA 'solar plexis'.

20 Also WG /ma/, KW /mat/. Note MN 'solar plexis', BM 'stomach'.

21 Expected MN (omun). There is a wide range of meanings: MN, BM 'belly'; TL /kùmún-soó/, MN /amun-sa/, FA /kumun-soo/ 'pregnant'; MN /ą amun/, FA /wok kumun/ 'deep', TL /òòk kùmún/ 'pool (of river)', TF /ook kumun/ 'lake', BM /ok kumun/ 'island'.

23 From BM /abin-am/ 'navel'. Note TL 'umbilical cord'.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
25	*naKaal *naŋkaal	shoulder, ten schouder, tien	nakaŗ$^{+}$	nákaàl	nákaál	nikaal	—
26	*c^{w}iiŋ	shoulder schouder	k^{w}iŋ	k^{w}íŋ-	tiŋ-	kiin-	kiiŋ
27	*ool	excreta poep, drek, stront	àr	òòl	ool	wool	oor
28	*tE̤ŋ	smell (n.) reuk	tàŋ	tàŋ	taŋ	taŋ	teeŋ
29	*abu	testicle testikel	apo	abu-	—	—	abo-
30	*yemaan	urine pis	imaŋ	ìmaán	imaan	imaan	yeman
31	*Kə̤meen	gourd kalabas	kemen	kàmeén	kameen	kameen	kameen
32	*wanE̤m	grass apron vr. schaambedekking	unam	únám	unam	—	wanem
33	*manül *mə̤nül	net hat nethoed	—	mánúl	maniil	maniil	maniir

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25 Note MN means 'shoulder' only.

26 Expected FA (kiiŋ). From TL /k^{w}íŋ-kún/, TF /tiŋ-kun/, FA /kiin-kun/ 'collar bone'.

27 Also WG /al/ 'belly'. Note FA, BM also mean 'intestines'.

29 From TL /àbù-loób/, BM /abo-roob/ 'testicles'. The second element in these compounds probably also occurs in *ibolob 'ball' (221) and FA /dumnoob/ 'heart', and seems to be cognate with or a by-form of *lab, *loob 'seed' (326).

33 Problematic MN /murur/ 'hat' may well prove to be cognate upon field checking of its phonemic transcription.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
34	*yaan *yɘ̈ɘ̈n	leg, foot been, voet	—	yàán	yaan	yaan	yaan
35	*ban *bɛ̈n *bOn	sole, palm voetzool, handpalm	pán	bán	ban	ban	—
36	*waiŋ	thigh dij	—	úŋ-	iiŋ-	eŋ-	aiŋ-
37	*waiŋ	calf kuit	waŋ-	ùŋ-	iiŋ-	waŋ	-eŋ
38	*meel	back of knee knie van achter	mɛ̌r	mèél-	meel-	meel	meer
39	*bɛ̈n	forearm, seven onderarm, zeven	pàn-	bàn	—	—	ben-
40	*afaan	left-hand linkerhand	afan	àfaán	awaan	abaan	awan
41	*feet-kun	forearm onderarm	het-on	fèét-kùn	feet-kun	feet-kun	—
42	*gUUŋ	joint, knob gelid, knobbel	-guŋ	-dùúŋ	-duuŋ	-gauŋ	guuŋ+

34 Also KW /yaan/.

36 From TL /úŋ-kún/, TF /iiŋ-kun/, FA /eŋ-kun/, BM /aiŋ-kun/ 'thigh'. See 37 for likely by-forms.

37 From MN /waŋ-on/, TL /ùŋ-íbóloób/, TF /iiŋ-ibloob/, BM /meer-eŋ/ 'calf'. See 36 for likely by-forms.

38 From TL /mèél-kún/, TF /meel-yuŋ/ 'back of knee'.

39 From MN /pan-on/, BM /ben-kun/ 'forearm', BM /ben-ker/ 'seven'.

41 Presumably *feet means 'forearm' since *kun 'bony' is a regular component of body-part compounds. Compare TF, FA /feet-kal/ 'seven'. Note MN 'outer elbow'.

42 From MN /koe-guŋ/, FA /teŋ-gauŋ/ 'wrist'; MN /kin-guŋ-an/, TL /tìín-dùúŋ-kóón/, TF /tiìn-duùŋ-koòn/, FA /kiin-gauŋ/ 'eyebrows'; TL /àbín-dùúŋ/ 'navel'. Note BM 'wrist'. See 43 for probable by-forms.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
43	*guuŋ	knob, joint knobbel, gelid	-goŋ	-dùúŋ	-duùŋ	-guuŋ	--
44	*tAŋkan	armpit oksel	takan	tákán-	takan-	tikan-	taŋan-
45	*buluŋ	nail, claw nagel, klauw	poroŋ	bùlùŋ	buīuŋ	buduŋ	buruŋ
46	*awooK	thumb, big toe duim, grote teen	awok	òók	awok	aok	auk
47	*CAtKət	little finger pink	kaket	kàkkát	tatkat titkat	kitkat	katket
48	*kun *kuun	bone, strong been, knook, sterk	ŏn	kún	kun	kun	kuun
49	*diim	flesh, meat vlees	rĭm	dìím	diím	diim+	riim
50	*melmeel	tendon, vein pees, ader	mamer	mèmeél	malmeel	malmeel	mermeer
51	*kaal	skin, bark huid, vel, schors	ạ̀r	kààl	--	kaal	kaar
52	*mə̈m *mə̈m	breath(e) adem(en)	--	màm	mam	mam	mem
53	*wan-	eat, drink eten, drinken	una-	una-	in-	wan-	wan-

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43 From MN /k^{w}e-goŋ/, TL /dèèl-dùúŋ/, TF /deel-duuŋ/ 'Adam's apple'; MN /koe-goŋ/, TL /sàkaál-dùúŋ/, TF /sìkiìl-duùŋ/, FA /teŋ-guuŋ/ 'knuckle, finger'; TL /yààn-dùúŋ/, TF /yaàn-duùŋ/, FA /yaan-guuŋ/ 'toe'. See 42 for probable by-forms.

44 From TL /tákán-téèm/, TF /takan-teem/, FA /tikan-teem/, BM /taŋan-tem/ 'armpit'.

48 Also WG /on/, KW /kun/.

49 Note FA 'vein'.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
54	*-teeb	hunger, thirst honger, dorst	-tep	-teeb	-teeb	-teeb	-teeb
55	*tIli- *tIlii-	chew[6] kauwen	tri-	tílì-	tilii-	tali-	—
56	*akal- *akaal-	recline, sleep liggen, slapen	ą- ąra-	àkaàl- àkàlà-	akaan-	akal-	akar-
57	*lOm *lɛ̈m	dream droom, dromen	rą́m	ílám	lam	lum	-rem
58	*moo-	stand (up) opstaan	mą̀	mòò-	—	—	moo-
59	*toin-	sit zitten	toun- tour-	tòòn-	tiin-	tain-	tain-
60	*weeŋ	voice stem	wěŋ	wèéŋ	weeŋ	weeŋ	weeŋ
61	*abën	laugh lach(en)	apen	àbán	aban	aban	abeeŋ
62	*ämë-	cry, weep schreien,wenen	me-	ámè-	ama-	ama-	ame-
63	*Usaan	vomit braken	usan	ùsaán	usaan	usaan	usan
64	*Fuu- *Fui-	vomit braken	fu-	fùù-	fii-	fuu-	fu-
65	*ci-bIlnɛ̈ŋ	belch, burp boeren	kiparaŋ	tìbìnàŋ	bilnaŋ	—	bineeŋ

54 Compounded with *yemën- 'taro, food' (121) to mean 'hunger' and with *ook- 'water' (158) to mean 'thirst'.

57 From BM /kiin-rem/ 'dream'.

61 This is a verbal adjunct. BM /ŋ/ by assimilation with following verb /gimin/?

63 The expression for 'vomit' consists of the adjunct *Usaan plus the verb *Fuu- (64).

65 By-form FA /bakalaaŋ/ from Archaic Ok.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
66	*afaaŋ	twins tweelingen	afaŋafaŋ	áfaàŋ	awaaŋ	awaaŋ	awaaŋ
67	*Caan- *c^{w}aan-	die sterven	kan-	kààn-	taan-	--	k^{w}aan-
68	*fOm	corpse lijk	hə̌m	fám^{+}	--	fom-	foom-
69	*gUl	scar litteken	gŭr	dàl	dal	gaal	-gur
70	*luin	a boil steenpuist	rùn	ìliìn	iin	laiin	--
71	*gaŋ	bitter bitter	gàŋ	dàŋ	--	-gaŋ	geŋ
72	*abaalabaal *ăbaalăbaal	itchy jeukerig	--	àbàlàbaál	abaalabaal	abaalabaal	abaarabaar
73	*geeŋ	scratch self zich krabben	geŋ-	dèèŋdeèŋ	--	geŋ-	geŋgeŋ
74	*Koboom *KobOOm	dumb stom	kopom	-kàbaám	--	kabom	-kaboom
75	*baa-	open eyes ogen openen	po-	bàà-	baa-	ba	--
76	*win	name naam	--	ún wín	win	win	wiin
77	*cInum *cInUm	man man	--	tànúm tìnúm	tinum	kinum	kunum

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68 From FA /fom-loŋ/, BM /foom kaamin/ 'burial platform'. Note TL 'funeral feast'.

69 From BM /abuŋ-gur/ 'scar'.

70 Expected TF (liin).

71 From FA /kaal-gaŋ/ 'itchy'.

73 By-form TF /dakaŋ-/ from Archaic Ok.

74 From TL /wèéŋ-kàbaám/ 'dumb', BM /kentem-kaboom/ 'deaf'

77 Also KW /kinum/.

No.	PMO	English	MN	TL	TF	FA	BM
78	*wanɛ̈ŋ	woman vrouw	unaŋ	ùnáŋ	unaŋ	wanaŋ	waneŋ
79	*imOK	male, husband mannelijk, echtgenoot	imak	ìmák	inak	kimak	imok
80	*yaŋkis	female vrouwelijk	akit	íkít	—	ikis	yaŋgis
81	*soi..	young woman jonge vrouw	sou	sòó	sii	saii	seib
82	*aatim	my father mijn vader	—	áàtím áàtúm	atam-	-aatim	aatim
83	*aalɛ̈b	his father zijn vader	arep	ààláb	aalab	aadab	aaret
84	*awooK	his mother zijn moeder	awok	òók-	awook	—	auk
85	*mɛ̈n	child kind	mén	mán màn	man	man	—
86	*miin	child kind	mǐn+	mìín	—	miin	min

78 Also WG /wunan/, /wanam/, KW /unaŋ/.

79 The initial /k/ of FA is unexplained, but it may be related to the prefix /k-/ 'your' in FA kinship terms.

80 Expected BM (yaŋgis).

81 Also WG /sonu/.[7] A similar final /n/ appears in MN in 238. The final /b/ of BM has parallels in 13 and 238.

82 The vowel of the second syllable is difficult to reconstruct. From TF /atameen/, FA /n-aatim/ 'my father'.

84 From TL /òók-eén/ 'his mother'. See 258 for a possible by-form.

85 Also KW /men/. See 86 for possible gender pair. (Drabbé 1954: 156).

86 Note MN 'son'. See 85 for possible gender pair.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
87	*ǃfaalik *afaaliK	grandfather grootvader	--	àfálík	awaalik	awaadik	awaarik
88	*ciiŋ	your elder brother jouw oudere broer	--	tìíŋ	tiiŋ	kiiŋ	kiŋ
89	*ɬiK	his elder brother zijn oudere broer	hèk	fìk	fik	fik	fik
90	*niiŋ	younger brother jongere broer	nìŋ	nììŋ	niiŋ	niiŋ	niiŋ niŋ
91	*neeŋ	younger sister jongere zuster	nèŋ	nèèŋ	neeŋ	neeŋ	neŋ
92	*kaleel	wife echtgenote	arer	kàleél	kaleel	kadeel	karer
93	*kaluun *KalUUn	widow(er) weduw(naar/e)	--	kàluún kùluún	kaluun	kaduun	karuun
94	*sinik *siniK	shadow, soul schaduw, ziel	--	sìník	sinik	sinik	sinik
95	*saŋ *sOŋ	story verhaal	sa̰ŋ	sàŋ	saŋ	suŋ	saŋ
96	*woos	drum trom	wàs	òót	was	woos	—
97	*am	house huis	àm	àm	am	am	am

87 Note TL 'male ancestor'.

89 Expected MN (hik).

94 The TF and BM forms mean only 'shadow'. There appears to be a by-form *simiK represented by MN /simik/ 'shadow' and TF /simik/ 'spirit'.

97 Also WG /am/, KW /am/.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
98	*siil	suspension bridge hangbrug	--	sìíl	-sííl	siil	siir
99	*watɨ	wall, fence wand, omheining	itu	ùtú	utii uti	wati	watii
100	*ɨ̈biin	floor vloer	pǐn	àbiín	abiin	abiin	abin
101	*ɨ̈biib	village dorp	pìp	ábiìb	abib	abiib	abiib
102	*KUtɨ̈b *KUtOb	ash as	kutap	kútáb	kutab	kutub	kuteeb
103	*yoom	knife mes	yam	yòóm	yoóm	yom	yom
104	*ɨ̈ŋkɨ̈-	steam cook stomen	ga-	áká-	aka-	aka-	aŋge-
105	*cikin *ciKin	bake in ashes bakken in as	--	tìkín-	tikin-	-kikin	-kikin
106	*Fuu-	cook koken	fu-	fùù-	fuu- fu-	fuu-	fu-
107	*kein-	cooked, burn gaar zijn, branden	ein-	kèèn-	kiin	kain-	kain-
108	*aniiŋ	fish vis	aniŋ	ániìŋ+	aniiŋ	aniiŋ	--

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98 From TF /sook-sííl/ 'vine bridge', /ook-sííl/ 'stairs'.

103 Actually a bamboo knife used for topping taros.

104 Actually cooked in a ground-oven of hot stones.

105 From TL /tìkín fùùmìn/, FA /as kikin/ 'steam cook', TF /tikin fuumin/ 'bake on ground in the open', BM /ais kikin/ 'embers'.

107 Only TL, TF, FA mean 'burn' as well as 'cooked'.

108 Note TL 'fish, tadpole'.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
109	*oom	sago sago	--	òòm	oom	woom	om
110	*suuk *suuK	tobacco tabak	--	súùk	suuk	sauk	suuk
111	*faa-	plait, weave vlechten,weven	ha- ha-	fàà-	faa-	faa-	faa-
112	*miib	plaited gevlochten	mip	mìib	miib	--	mib
113	*laa-	to plait,braid vlechten	ro-	ìlà-	--	laa-	raa-
114	*sook	rope, vine touw,klimplant	sà	sòòk	sook	sook	sook
115	*wanuuK	bow boog	anok	únuúk	unuk	wanuuk	wonuk
116	*wan	arrow pijl	án	ún	wan	wun un	oon†
117	*bina- *binU-	shoot schieten	pina	bínú-	bina-	bina-	--

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109 Also KW /oom/.

110 FA /au/ is unexpected, but may be related to NN /sawuk/ and NS /sabuk/. These may be indirect loans from Spanish/Portuguese tabaco or Malay tambako resulting from the introduction of the tobacco plant into New Guinea about 300 years ago. See Riesenfeld 1951. The reflexes of *suuk, *suuK are no less regular than for many other reconstructed forms, and provide no conclusive evidence on the inherited or borrowed status of these words.

113 This form means 'to plait or braid' rope whereas 111 means 'to plait or weave' an armlet, basket, or net bag.

115 Presumably *wanuuk is a derived form from *wan 'arrow' and a noun derivational suffix *-uuk which is found in a few TL words and which may be a by-form of TL /-ook/ noun derivational suffix.

116 Note BM 'arrow for shooting humens'.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
118	*yOm	ripe rijp	yám-	yám	yam-	yum	yoom
119	*k^{W}eit	sugarcane suikerriet	k^{W}eĭt	k^{W}èét	kiit	k^{W}ait	—
120	*waan	sweet potato zoete bataat	wǎn^{+}	wàán	waán	waan	wan^{+}
121	*yemën	taro keladi, tales	imen	ímán	ima yema	iman	yemen
122	*yawoot	breadfruit broodboom	iwat	yòót	yawot yawat	—	yoot
123	*suum	banana banaan	sòm	sùùm	suum	suum	sum
124	*aweem	taboo taboe	awem	àbeém	aweem	aweem	aeem
125	*tIlis	rattan species rotansoort	tirit	tílít	tilis	tadis	—
126	*dëKën *dëgkën	rattan species rotansoort	rekeŋ	dàkán	dakan	dikan	—
127	*as	tree,wood,fire boom,hout,vuur	às	àt	as	as	ais

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118 MN and TF are verbal forms.

119 Also WG /kot/, KW /k^{W}eet/.

120 Also KW /waan/. Note TL 'yam, sweet potato', BM 'yam'.

121 Also WG /imen/, /yimen/, KW /yaman/.

122 Also WG /yuwat/.

123 Also WG /som/, KW /suum/.

124 Expected BM (aweem). TL has a by-form /àmeém/.

127 Also WG /as/, /ais/, KW /as/.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
128	*as-tūŋ	branch tak	a-tuŋ	à-túŋ[8]	as-taŋ	a-teŋ	ais-tiŋ
129	*cimcim	root wortel	kimkim	tìmtím	timtim tamtim	kimkim	kimkim
130	*gool *gual	forked gevorkt	guwar	dóól	dool	--	goor
131	*cait *cais	flower bloem	-kèt	téèt kèèt	tees	-kait	--
132	*weim- *waim-	animal tail staart v. dier	usan unsan winsan	úmsán	wamsan	waim	--
133	*bēl	wing vleugel	pér	bál-	bal	bal	ber-
134	*ūm	nest nest	úm	úm	im	em aim	im
135	*win	egg ei	wín ún	ún+ wín+	win	win	win
136	*koiŋ *Koiŋ	pig varken	--	kòòŋ	kaŋ	kuŋ	kaiŋ
137	*saamin	wild pig wild varken	--	sààmàn	saamin	scamin	samin

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128 *as-tūŋ is presumably a compound of *as 'tree' and *tūŋ which is probably a by-form of *teiŋ, *taiŋ 'arm, hand' (239).

130 The MN form /ror/ has the first two phonemes unexpected and should probably be regarded as a loan from TL.

131 From MN /a-ket/, FA /as-kait/ 'flower'.

132 Also WG /wisen/, KW /waimsan/. The second syllable in all but FA (*-san, *-sēn) has not yet been identified as a morpheme in these languages.

133 From TL /bál-kún/, BM /ber-kun/ 'wing'.

135 Note TL 'yolk'.

136 Also KW /kooŋ/.

137 Expected TL (sààmìn).

No.	PMO	English Dutch	MN	TL	TF	FA	BM
138	*nuuk	marsupial buideldier	nò	nùùk	nuuk	nuuk	nuuk
139	*watoom	wallaby kanggoeroe	--	ùtoóm	utoom	watoom	watoom wotoom
140	*waǩil *wakil	bush fowl sp. boskipsoort	--	úkíl	wukil ukil	wakal	wokiir
141	*kaweel *Këweel	hornbill neushoornvogel	--	kàbeél	kawel	kawel	kawer
142	*namE̋	white cockatoo witte kaketoe	-nama	nàmá-	nama-	nama	name
143	*awoon	bird vogel	wàn	úùn	awoon	awoon	aon
144	*sIŋkaam *sAŋkaam	flying fox vliegende hond	sakam	sákaàm	sakaam	sikaam	siŋam
145	*meen	string bag (draag)net	mĕn	mèén	meén	meen	meen
146	*cim	head louse luis	-kim̀	tim̀	tim	kim	kim
147	*k^{w}aiŋ *k^{w}eeŋ	grasshopper sprinkhaan	k^{w}èŋ	k^{w}éèŋ	--	k^{w}eeŋ k^{w}aiŋ	k^{w}ieeŋ
148	*tInoom *tAnoom	cockroach kakkerlak	tanam	tínoòm	tinoom	tanom	--
149	*inab *inE̋b	snake slang	inap	ìnáb	inab	--	--

138 Also WG /noi/, KW /nuuk/.

140 Expected FA (wakil). Problematic MN /ak^{w}eir/ needs checking for morpheme boundaries.

142 From MN /wa-nama/, TL /nàmá-yím/, TF /nama-yim/ 'white cockatoo'.

145 Also WG /men/, KW /meen/.

146 Also WG /ko-kim/, KW /kim/. From MN /go-kim/ 'head louse'.

148 Problematic BM /tanambi/ needs checking for morpheme boundaries.

149 Also WG /inap/, KW /inab/.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
150	*Ätiim	lizard, iguana hagedis, leguaan	tim	átiim	àtiim	atiim	aatiim
151	*tooKUUm	centipede duizendpoot	takum	átòkuùm+	--	tokum	takuum
152	*kool *Kool	frog kikvors	--	kòòl	kool	kul	koor
153	*abiil	sky hemel	apir	àbiíl-	àbiil-	abiil	abiir
154	*Ätaan	sun zon	--	átaàn	átán	ataan	atan
155	*kayoob *Kayoob	moon maan	--	káyoòb	kàyoòb	kayoob	kayoob
156	*tawaal	ground, earth grond, aarde	rapar	--	tawaal	tawaal+	tawaar
157	*bim	earthquake aardbeving	--	bim	bim	bim	bim
158	*ook	water water	ạ̀	òòk	òk wòk	wok	ook
159	*amgu	mountain, hill berg, heuvel	amgo-	àmdù	amdu	amgu	amgu-

151 Note TL 'scorpion'. Initial /a/ in TL is unexpected.

153 From TL /ábiíl-tikiín/, TF /àbiil-tikiin/, BM /abiir-kib/ 'sky'.

154 Also WG /san/, /tan/ (positively indicating *Ä), KW /ataan/.

155 Also KW /kayoob/.

156 Expected MN (tawar). Note FA 'soil'.

158 Also WG /aiyo/, KW /ook/.

159 Also KW /amgu/. From MN /amgo-rim/, BM /amgu-tikin/ 'mountain'. Perhaps *amgu 'mountain' was once a compound of *am 'country, place, house' and *guu 'head'. Apart from the occurrence of the consonant cluster *mg in this form there is no present-day evidence of such a morpheme boundary. However, there is the MN semantic analogy /am gapam/ 'mountain'.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
160	*koot *Koot	cliff rotswand	--	kòót	koót	-koot	-kot
161	*biil	valley vallei	pǐr	bìíl	biíl	biil	biit+
162	*sǫn *sɛ̃n	seed zaad	-sàn	sàn	san	-sun	sen
163	*bool	ground oven grond oven	fàr	bool	--	bol	boor
164	*tuum	stone steen	tǒm	tùúm	tuúm	tuum	tuum
165	*tool	soil, mud aarde, modder	--	tòól	toól	tol-	taar
166	*biseel *fiseel *Fiseel	old person oudere mens	piser-	biseel+	--	fasel	fiser
167	*tukul *tUKUl	fat (n.) vet (sb.)	--	túkúl	-tùkùl	tukul	tukur
168	*dOl	shallow ondiep	rár	dál	dal+	dul	--

160 From FA /amgu-koot/ 'cliff', BM /tuum-kot/ 'limestone outcrop'.

161 Expected BM (biir) 'plains'.

162 From MN /a-san/ 'seed', FA /iman-sun/ 'taro cutting (for replanting)'. For parallel vowel set see 57.

163 Expected MN /par/. See 104 notes.

164 Also WG /tom/, KW /tuum/.

165 From FA /tol-makol/ 'blue clay'. BM means 'soil' but not 'mud'.

166 From MN /piser-ip/ 'big'. Note TL 'adult'.

167 From TF /dú-tùkùl/ 'bald'. TL, TF, FA, and BM all contain a compound whose proto-form is *guu-tukul, *guu-tUKUl 'bald' formed from 'head' (2) and 'fat' (167).

168 Note TF /oòk dal/ 'exposed river bed'.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
169	*ilUUm *ïluum	heavy zwaar	--	ìluúm	ùluùm	iduum	iruum
170	*fooɣ	light (weight) licht (niet zwaar)	hə̌ɣ	fòóɣ	foóɣ	-fooɣ	fooɣ
171	*ätul	sharp scherp	tòr^{+}	átúl	atul-	atul	atur
172	*Füüm	blunt stomp, bot	fə̌m	fùúm	fiím	fiim	fim
173	*mImin *mAmin	hot warm	mimin	mìmín	mamin	--	mamin
174	*giil	cold koud	gìr	dìil	diil	-giil	--
175	*gaal	tired moe	gə̌r	dàál	daal	--	gaar.
176	*abaal *äbaal	sweet zoet	--	àbaál	àbaàl	abaal	abaar
177	*feen-	search for, wait for zoeken,wachten	hen-	fèèn-	feen-	feen-	feen-
178	*celel-	make maken	kerer-	tèlél-	talal-	kedeel-	kerer-
179	*fUkUn-	think denken	fun-	fúkún-	fuku-	fukun-	fukun-
180	*bakaa-	speak, say spreken,zeggen	pə̨-	bákà-	bakaa-	bakaa-	baka-

170 From FA /kaal-fooɣ/ 'light'.

171 Note MN 'sour'; TL, TF mean 'pain' as well as 'sharp'. From TF /atul-im/ 'sharp'.

174 From FA /kaal-iim giil/ 'shiver'.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
181	*miŋki-	wear (clothes) kleren dragen	--	míkí-	miki-	miki-	miŋgi-
182	*-tëm-	see zien	-tem-	-tám-	-tam-	-tam-	-tem-
183	*yukut *yaKUt	steal stelen	--	yùkuút	yukut	yakot	yakut
184	*teem	hole, in gat, in	tèm	tèém	teém	teem	teem
185	*une-	go gaan	une-	úné-	une-	une-	une-
186	*tele-	come komen	tere-	télè-	tele-	tada-	tere-
187	*kuku- *KUKU-	show tonen	--	kùkù-	kuku-	kuku-	kuku-
188	*bInim *bAnim	nothing niets	pirim	bínim	--	banim	banim
189	*aliK	all alle	arik	alik+	alik	--	arik

182 This verb takes an obligatory set of object person prefixes.

183 This form seems to be a verbal adjunct.

184 Also KW /-teem/ 'in'.

185 Also WG /yiw-uneapi/ 'walks', /fadud-unepade/ 'runs'.

186 The vowels in FA suggest the punctiliar stem, whereas *tele- is the continuative stem.

188 Problematic TF /diniim/ has the second syllable unexpectedly long and has an unexpected initial /d/ which, however, parallels an unexpected /da/ for *ba, the negative particle (391).

189 Note TL 'whole'. There is another form in several languages, MN /arukum/, TL /àlúkùm/, FA /adikum/, which may be reconstructed as *alüKUm 'all'. This is presumably derived from *aliK by a derivational suffix *-Um which is found in a few TL words and which may be a by-form of TL /-im/ noun derivational suffix.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
190	*taab	daytime, noon daglicht, middag	tăp	tàáb	taáb	taab	taab
191	*am	day, weather dag, weer	àm	àm	àm	am	am
192	*minlil-	night nacht	mirir-	mìlìl-	--	--	minir-
193	*c^{w}iin-	dark, afternoon donker, namiddag	k^{w}in-	k^{w}ììn-	tiin-	kiin-	k^{w}iin-
194	*kamɛ̈^{il} *Kamɛ̈^{il}	now nu	--	kàmaá$^{+}$	kàmà-	kam-	kame
195	*sin-	yesterday gisteren	sin-	-sin-	sin-	-sin-	siin-
196	*kutim *KUtim	morning ochtend	--	kùtím	kutim	kutim	kutim-
197	*daaK	below beneden	-rak	dàák	daák	dak	raak-

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191 Also WG /am-oyokenopade/ 'night'.

192 From MN /mirir-an/ 'dark', /mirir-um/ 'black', TL /mìlìl-iìb/, /mìlìl-eèb/ 'night', BM /k^{w}iine mirir-ib/ 'night'. FA /am midla/ 'night' will probably prove to be cognate when an accurate phonemic transcription of it is obtained. The intervocalic /n/ of BM is unexpected and *nl is a guess.

193 This seems to be a verbal form. The word for 'afternoon' would be in the neutral (unmarked) tense, punctiliar aspect, third person singular, e.g. TL /k^{w}ììn-à/.

194 From TF /kàmà-nò/, FA /kam-no/ 'now'. Note TL 'now, new'.

195 From MN /sin-ta/, TL /àm-sìn-tá/, TF /sin-ya/ 'yesterday', FA /am-sin-ota/ 'tomorrow', BM /siin-ete/ 'yesterday'. This reconstruction is probably a by-form of *siin 'old' (MN /sin/, TL sììn/).

196 From BM /kutim-inirib/ 'morning'.

197 From MN /a-rak/, BM /daak-ba/ 'below'. It is interesting that TL also has /kù-laák/, the allomorphic alternation of /d-/ and /-l-/ suggesting submembership of these two sounds within the one phoneme at an earlier stage of TL.

No.	PMO	English Dutch	MN	TL	TF	FA	BM
198	*meeb	near, short nabij, kort	mĕ̀p	mèéb	meéb	meeb-	meeb-
199	*sil	needle naald	sír	síl	síl	sil	siir
200	*koom *Koom	wide wijd	--	kòòm^{+}	-koom	k^{w}oom -koom	-kom
201	*naam	cuirass (borst)harnas	--	nààm	naàm	naam	naam
202	*cimit	cucumber komkommer	kimit	tímít	timit	kimit	kimit
203	*teebaa..	tapioca, manioc tapioca	--	tèèbàbuù	tebaayii	teebaayok	tabaari
204	*KUmUK *KUmaK	ginger (plant) gember	kumuk	kúmák	kumak	kumak	--
205	*miil	native bean inheems boon	mĭ̀r	mìíl	míl	miil	--
206	*leib	path, way pad, weg	reĭ̀p	ileeb	liĭ̀b	laib	raib

198 From FA /meeb-so/ 'near', /meb-tanug/ 'short', BM /meeb-so/ 'near'. TL /mèéb-soó/ 'near, shallow', TF /meeb-kan/ 'short' in addition to free /meeb/.

199 Vowel length in BM in unexpected.

200 From TF /às koom/, FA /as-koom/, BM /at-kom/, /as-kom/ 'shield' (a single adzed board of wood (*as) about 2 ft. by 4 ft.). Note TL 'smooth'.

202 The reflexes are completely regular and thus provide no evidence of this being a loan word. Riesenfeld 1951 suggests that the cucumber is one of several vegetables introduced to New Guinea within the last four centuries.

203 On the other hand this form is most difficult to reconstruct, both with respect to the vowel of the first syllable, and with respect to the nature of the third syllable. It is very likely a loan word from Portuguese tipioca. This is also regarded by Riesenfeld 1951 as an introduced plant.

206 Also MG /lepute/, /leipo/, KW /laib/.

No.	PNO	English Dutch	MN	TL	TF	FA	BM
207	*maakub *maaKUb	one een	---	maakub	maakub	maakub	makub
208	*aleeb *ƛleeb	two twee	---	àleéb	àleèb	aleb	areeb
209	*asU	two twee	asu	asu-	asu-	asu-	--
210	*deeŋ	twenty-seven zevenentwintig	---	dèéŋ	deeŋ	deŋ	-reŋ
211	*soo	and, with en, met	-sa	sòó	soo	soo	soo

207 Perhaps also WG /maŋkopo/. This may be formed from *maa 'other' (403) and *kub 'only' (TL, TF, FA, BM /kub/).

208 This is probably a by-form of *aloob, *ƛloob 'two' (TL áloòb/).

209 From TL /asunoo/, TF /asumanoo/, FF (for FA) /asuno/ 'three'. These forms almost certainly represent an "Australian" type of counting system in use before the introduction of the round-the-body method of counting. The TF form is the clearest: /asu-ma-noo/ lit. 'two-another-also'. The TL and FF forms would seem to involve loss of the middle vowel and reduction of the consequent *mn to /n/.

210 From BM /fuu deŋ/ '27'. FA also has /deŋdeŋ/ 'many'. Twenty-seven is a counting unit on the round-the-body system.

211 From MN /are-sa/ 'married man' (lit. 'wife-with').

No.	PMO	English Dutch	Evidence
212	*dam	body, full-grown lichaam, volwassen	MN /rạm/; TL /dàm/; FA /dam/
213	*kaliim *Kalim	body hair lichaamshaar	TF /kaliim/; FA /kalim/; BM /karim/; KW /kalim/
214	*cilooŋ	ear oor	TL /tòloòŋ/; TF /tílaaŋ-aal/ (expected (tílooŋ-aal)); KW /kadoŋ-kaal/
215	*lom *lum	covering bedekking	TL /ílúm/ 'foetal/egg sac', /tìin-ílúm/ 'eyelid'; TF /tiin-doom/ 'eyelid'
216	*maŋkat	mouth mond	FA /makat-kalim/ 'whiskers'; BM /maŋkat-kun/ 'chin', /maŋkat-koon/ 'beard'
217	*fIlaŋ *FAlaŋ	tongue tong	TF /fíláŋ/; FA /falaŋ/; KW /falaŋ/
218	*fuk *FUK	neck hals	TL /fúk-kún/; TF /fùk-kún/; FA /fuk/
219	*kum *KUm	side of neck, eleven kant van hals, elf	TL /kùm/; TF /kum-kal/; FA /kum/
220	*KaKab *Kaŋkaŋ	lung long	MN /kakap/; TL /kákáb-kòón/; FA /kakab-taŋ/
221	*iboloob	ball bol	TL /ùŋ íbóloób/ 'calf'; TF /iiŋ ibloob/ 'calf'; BM /iborob/ 'heart'
222	*fIkin *FIKin	intestines darmen	TL /fíkín/; TF /fikin/ 'stomach'; FA /fakan/ (expected (fikin)); KW /fakin/ 'belly'
223	*in	liver lever	MN /in/; TL /ín/; TF /in/, /yin/
224	*k^{W}ëën *k^{W}EEn	gall gal	TL /k^{W}aan-aal/ 'pancreas'; FA /k^{W}an/; BM /k^{W}een/
225	*daaŋ	back rug	MN /rạŋ-on/; TL /dàáŋ-duúŋ/, /dàáŋ-kún/; FA /daaŋ/; KW /daaŋ/
226	*maaK	shoulder blade schouderblad	MN /mạk-on/; TL /mààk kún/; WG /mak-om/

No.	PMO	English Dutch	Evidence
227	*biim	buttocks achterste	MN /pimpiaŋ/; TL /bìím dáàŋ/; TF /biim kun/, /biím daaŋ/
228	*eit	penis penis	MN /eit/; TL /èét/
229	*nook	vagina vagina	MN /nạ/; TL /nòók/
230	*KaKmUK	heel hiel	MN / kapmuk/; TL /kábmuùk/ 'ankle, heel'; FA /kakmuk/
231	*moKuK	ankle enkel	MN /mokok/; TF /yaan makuk/ 'ankle, heel'
232	*bukUb *buKub *buŋkub	wrist pols	TL /sàkaál búkùb/; TF /bokob/; FA /kibin bukub/ 'elbow'
233	*katuun *Katiin	knee knie	TL /kátuùn/; FA /katuun/; BM /katin/
234	*siKiil *siŋkiil	hand, arm hand, arm	MN /sikir-on/ 'foot'; TL /sìkiíl/; TF /sikiil/; WG /sikil/
235	*saKaal *saŋkaal	hand, arm hand, arm	MN /sakạr/ 'leg'; TL /sàkaál/; FA /sikàal/
236	*Kul	hand hand	MN /koir-on/; TL /kúl/; WG /ko/, /korinte/
237	*..kuk *..KUK	right hand rechterhand, rechts	TL /ìbkúk/; TF /timkuk/; FA /iibkuk/
238	*tui..	upper arm,nine bovenarm,negen	MN /ton-on/; TL /tù/; FA /tai-kun/; BM /taip/; (cf. 13 and 81 final consonants)
239	*teiŋ *taiŋ	hand, arm hand, arm	TL /tééŋ mìlií/ 'arm'; FA /teŋ/ 'hand'; BM /taiŋ/ 'hand'; KW /teŋ/
240	*keim *Kaim *cuim	blood bloed	FA /kaim/; BM /kaim/; KW /kaim/
241	*ileem	blood bloed	MN /irem/; TF /ileem/; WG /ideim/, /idem/

No.	PMO	English Dutch	Evidence
242	*daam *gaam	sap sap	TL /dàám/
243	*ifak	perspiration zweet	MN /ifa/; TL /ìfák/; FA /ibak/
244	*mook *mooK	spittle speeksel	TL /mòók/; TF /moók/
245	*sibiliŋ	sneeze niezen	TL /síbílìŋ/; TF /sibliŋ/; FA /sibidiŋ/
246	*koon- *Koon-	cough hoesten	FA /k^{w}oon-/; BM /koon-/
247	*itam *itaŋ	hiccup hikken	TL /ìtám/; FA /itaŋ/
248	*tuŋtaK *tuŋtaaK	yawn gapen	MN /tuŋtak/; TL /tùŋkàk/; FA /tuŋtaak/
249	*kafën	live, alive leven(d)	MN /afen-piepe/; TL /kàfán-soó/; TF kawoŋ-soo/ (expected (kawaŋ))
250	*fasuu- *Fasuu-	swollen gezwollen	TF /fasuu-/; FA /fasu-/; BM /fasu-/
251	*abaŋ *ämbuŋ	a sore wonde	TL /ábáŋ/; TF /abaŋ/; BM /abuŋ/ (for vowel cf. 255)
252	*isak *asak	pus, blood etter, bloed	MN /isa/ 'pus'; TL /ìsák/ 'blood'; FA /asak/ 'pus', /isak/ 'blood'; BM /kiin asak/ "cataract"
253	*amsaaŋ	scaly skin, tinea kaskado	TL /àmsaáŋ/; FA /amsaaŋ/; BM /amsaŋ/
254	*iwiit	lame kreupel	TL /íbìt/; TF /iwiit/; FA /iibiit/ 'a sore'
255	*kan *kun	female vrouwelijk	TF /abaabkan/ 'elder sister'; FA /baabkun/ 'elder sister'; FF /akuun/ 'mother'
256	*k^{w}eet	bachelor jongeling, jonkman	TF /keet/; FA /k^{w}et/

No.	PMO	English Dutch	Evidence
257	*KabKees *kabkees	bachelor jongeling, jonkman	TL /kàbkeét/; FA /kabkes/
258	*usoom *isoom	old man oude man	TL /ùsoóm/; TF /ísoóm/ 'benevolent man'
259	*afook	grandmother grootmoeder	MN /afok/; FA /awok/. (By-form of 84?)
260	*moom	mother's brother moeders broer	TL /mòòm/
261	*tën	child kind	MN /-ten/; TL /tán/; FA /tan/ 'son'
262	*aul	child, ancestor kind, voorvader	TL /òòl-ál/ 'ancestors'; BM /aur/ 'child, foetus'
263	*baab	my elder brother mijn oudere broer	TL /bàáb/; TF /ábaáb/ (first vowel cf. 151); FA /baabnak/
264	*een	elder sister oudere zuster	MN /en/; TL /-eén/ feminine suffix; TF /yeen/; BM /en/
265	*mulub	grandchild kleinkind	MN /morofet/, /moropser/; TL /mùlúb/ 'descend nts'; FA /mulubkas/
266	*baat *baas	sibling-in-law schoonsibling	TL /bààt/, /bààs-ím/
267	*ulimël *ëlimël	family gezin	TL /úlímàl/; TF /alimal/; BM /yerimer/
268	*kayaak *KayaaK	friend vriend	TL /kayaak/ 'associate'; TF /kayak/
269	*kabeel *Kabeel	parallel-cousin parallel-cousin	TL /kábeèl/, /kábèlím/
270	*alak	his cross-cousin zijn cross-cousin	TL /àlák/; FA /k-alak/ 'your cross-cousin'
271	*naiK	my cross-cousin mijn cross-cousin	MN /nek/ 'friend'; TL /nèék/; FA /naik/

No.	PMO	English Dutch	Evidence
272	*bëKeel *bëgkeel	ghost geest, schim	MN /peker/; TL /bákeèl/, /bákaàl/
273	*saKbal *sakbal	ghost geest, schim	TF /sakbal/; FA /sakbal/
274	*ku- *KU-	marry huwen	TL /kú-/ 'take it, marry her'; FA /ku-/; BM /ku-/
275	*kulu- *KUlU-	marry huwen	TL /kulu-/ 'take them, marry them'; TF /kulu-/
276	*usoog *Usoog	medicine man toverdokter	TL /ùsoóg/; TF /usoog/; FA /usoog/
277	*kamook *KamooK	headman dorpshoofd	TL /kàmoók/; TF /kamook/; BM /kamok/
278	*bën *ban *bOn	ceremony feest	TL /bàn/
279	*boi-	play drum trommelen	MN /bou-/; TL /bòò-/
280	*ail-am	tree house huis op stelten	TL /èél-ám/; TF /eel-am/; FA /ail-am/; BM /ari-am/ ?
281	*yowool	ceremonial house ritushuis	TL /yóòl àm/; TF /yówól ám/; FA /yool am/
282	*gug-am	menstrual house vrouwenhuis	MN /gog-am/; TL /dùg-àm/
283	*amiit	doorway deuropening	MN /amit/; TL /ámìt-eém/; TF /ámiít-oóm/
284	*toom *soom	doorway deuropening	TF /ámií-toóm/; FA /ab-soom/; BM /abi-soom/
285	*tulum *tUlUm	stairs, steps trap	MN /turum/ 'vine bridge'; TL /tùlúm/; FA /tudum/
286	*kuk *KoK	wall wand	TL /kúk/ 'wall of men's house'; BM /kok/
287	*baan	place plaats	MN /pan/ 'ground'; TL /baan/ 'proper place'; WG /panu/

No.	PMO	English Dutch	Evidence
288	*mool	embers gloeiend hout	TL /àt mòól/; TF /às moól/; FA /waiŋ mol/ 'charcoal'
289	*weiŋ	fire vuur	TA /wiŋ/; FA /waiŋ mol/ 'charcoal'; BM /waiŋ/; KW /waiŋ/
290	*abul- *Abul-	light fire vuur aanleggen	TL /àbúl-/ 'burn off in the open'; TF /abul-/; BM /abur-/
291	*iib	cloud wolk	MN /ip/; TL /ííb/; FA /iib/
292	*laek *laeK	smoke rook	TF /as-lak/; FA /as-laik/; BM /raik/
293	*cib	ash (white) as	MN /kip/; TL /à-tíb/; TF /as-tib/
294	*tUm	smoke rook	MN /tum/; TL /à-túm/; WG /tum/
295	*eek *ecK	ashes as	TL /èèk/; TF /yeok/, /eek/
296	*UUK	ashes as	MN /uk-tem/; TL /ùùk/
297	*kalaleeŋ *Kalaleeŋ	bush knife, machete kapmes	TL /kàlàleèŋ/; TA /kararaŋ/; FF /kalaleŋ/
298	*aal	cook over open fire braden over open vuur	MN /ar-im fu-/; TL /àál fùù-/; TF /aal fuu-/; FA /aal fuu-/
299	*kafoob *Kafoob	crab krab	TL /káfoób/; TF /kàwoòb/; FA /kaboob/
300	*wii-	twist (rope) twijnen	TF /wii-/; FA /wii-/; BM /wii-/; cf. 379
301	*Ulii-	twist (rope) twijnen	MN /uri-/; TL /úlì-/
302	*wi- *wii-	cut, fell (om)hakken	MN /as wi-/

No.	PMO	English Dutch	Evidence
303	*biyaal	black palm zwarte palm	TL /bíyaàl/; BM /biyaar/ 'black palm club'
304	*ulin *Ulin	club knots, knuppel	TL /ùlín/; TF /ulin/; BM /uriin/
305	*tinim *cinim	bow boog	TL /tíním/ (a Fegolmin bow)
306	*wal	bowstring boogpees	MN /an-uwar/; TL /ún-ál/; TF /un-al/; FA /wal/, /wan-uwal/
307	*biliil	(opossum) arrow (opossum) pijl	TL /bíliìl/; TA /brir/; BM /biriir/
308	*kanaat *Kanaat	(pig) arrow (varken) pijl	TL /kanaat/; TA /kanaat/; BM /kanaat/
309	*geem	(bird) arrow (vogel) pijl	TL /dèèm/; BM /geem/
310	*waasi	war, enemy oorlog, vijand	TL /wáásí/; TF /waásì/; FA /waasi/
311	*loŋ	garden, farm landbouw, tuinbouw	MN /raŋ/; TL /íláŋ-diìb/; TF /laŋ-abib/; FA /yoŋ/ 'garden', /fom-loŋ/ 'burial platform'; BM /yoŋ/
312	*daam	fence omheining	TL /dàám/; FA /daam/
313	*diKi- *diŋki-	clear bush rooien	MN /riki-/; TL /dìkì-/; TF /digi-/ ?
314	*al	weeds onkruid	TL /ál/; TF /al/; FA /al/
315	*toloob	meat (food) vlees (spijs)	TL /tòloób/; FA /tadoob/
316	*faaliŋ *Faalin	rattan species rotansoort	TL /fàálíŋ/; TF /faalin/; FA /faalin/
317	*ilii	bamboo species bamboesoort	MN /iri/; TL /ìlií/; TF /ilii/
318	*daal	bamboo species bamboesoort	MN /rar/; TL /dààl/; FA /daal/

No.	PMO	English Dutch	Evidence
319	*gimii	bamboo species bamboesoort	MN /gomei/ (expected (gimi)); TL /dìmíí́/; TF /dimii/; FA /gemii/
320	*ookeet *ooKees	gourd water bottle kalabaskaraf	TL /òòkeèt/
321	*mauK	stone adze stenen bijl	MN /mok/; TL /móók/; FA /mauk/
322	*FAbii	stone adze stenen bijl	MN /fapi/; TL /fìbíí́/; TF /fawi/
323	*duk *gUK	spike stekel	TL /dúk/
324	*ciim	trunk (of tree) boomstam	TL /tìì́m/; TF /tiim/; FA /kiim/
325	*moŋkom *mOŋkOm	tail staart	TL /màkám/ 'origin'; FA /maŋam/; BM /moŋom/; /ais moŋom/ 'tree trunk'
326	*lab *loob	seed zaad	TL /íláb/, /ìlaáb/, /ìloób/; TF /as lab/ 'fruit, seed'; see also 29 notes, 221.
327	*dŭm *gŭm	fruit vrucht	TL /dùm/; FA /gim/; BM /rem/
328	*siŋsooŋ	roofing grass alang-alang	TL /sínsoòŋ/, /síŋsoòŋ/; TF /siŋsooŋ/; FA /sansoŋ/
329	*tĕktoek *tĕkteeK	grass species grassoort	TL /tèkkeèk/; TF /takteek/; FA /takdiek/
330	*ool-duum	tail (of bird) staart (v. vogel)	TF /ool duum/; FA /woluum/; BM /wuruum/
331	*mAyaan *mIyaan	dog hond	TF /miyaan/; FG /mayan/; BM /miyan/; KW /mayaan/
332	*sŭmUl	wallaby kanggoeroe	MN /sumur/; TL /sùmùl-ím/; TF /simul-im/, /simul-yim/
333	*koloom *Koloom	bird of paradise paradijsvogel	TL /kòloòm/; TF /kaloom/; BM /karoom/
334	*saŋaa	bush fowl sp. boskipsoort	MN /saŋa/; TL /sàŋaá/; FA /saŋga/

No.	PMO	English Dutch	Evidence
335	*yoom	flying fox vliegende hond	TL /yóóm/; FA /yoom/
336	*simiin	bat vleermuis	TL /sìmɨ̀nsímɨ̀n/; TF /simɨin/
337	*timiin	bat vleermuis	TL /tímɨ̀n-eéŋ/; FA /timin-ok/; BM /timin-eŋ/; /timin-am/ 'cave'
338	*sinook *sinooK	rat rat	MN /sunuk/ ?; TL /sínoòk/; TF /sinook/; FA /sinok/
339	*mUUmUU	mosquito muskiet	MN /mumu/; TL /mùúmuù/; TF /muúmuù/ 'bee'
340	*gimgim	mosquito muskiet	TL /dɨ̀mdím/ 'gnat'; BM /gimgim/
341	*sUlUUb	cockroach kakkerlak	MN /surup/; TL /sàluúb/ 'black hopping insect'
342	*debyel	ant mier	MN /teper/ (expected (reper)); TL /dèbeèl/, /dùbeèl/; TF /dabyal/
343	*maatUUb *maatuuk *maatuuK	crocodile krokodil	TL /mààtuùb/; TF /maatuuk/; FA /maatuk/; FG /maatub/; KW /maatub/
344	*Kaliim	moon, month maan, maand	TL /kàliím/; TA /karim/; WG /yipi-kali-ete/
345	*bakan *baKon	ground, earth grond, aarde	TL /bàkàn/; TF /bokon/ 'territory'; TA /bakun/ 'territory'; FA /bakan/
346	*oon *woom	rain regen	TF /woon/
347	*waib *weib	rain regen	TL /wèéb/; FA /waib/; KW /waib/
348	*suuK	rain regen	MN /sok/; BM /suuk/; WG /soko/, /suko/
349	*ciman *cimaan	thunder donder	TF /timan/, /taman/; FA /kimaan/; BM /kiman/
350	*tumuun *cumuun	thunder donder	TL /túmuún/

No.	PMO	English Dutch	Evidence
351	*guluul *galul	wind wind	MN /goror/; TL /dùlúl/; FA /gaduul/; WG /kaloð-ote/
352	*inim	wind wind	TF /inim/; FA /inim/ 'breeze'; BM /inim/; KW /inim/
353	*beil	ridge bergrug	MN /peir/; TL /bèèl/; WG /ped-ote/, /peid-o/ 'mountain'
354	*tikiin *tiKiin	mountain, on top of berg, boven	TL /tìkiín/ 'on top of', /àmdù tìkiìn/ 'mountain'; BM /amgu tikin/ 'mountain'
355	*tibin *cibin	valley,headwaters vallei,bovenloop	TL /tìbìn/
356	*mük *müK	lake meer	TL /òòk mùk/; TF /-mik/ (in lake names); FA /ok mik/
357	*scib *seeb	forest bos	TL /sèéb/; TF /siíb/; FA /seeb/
358	*dindin	sand zand	MN /ririn/; TF /ook-diniin/; BM /ok-rinin/; WG /didinai/
359	*k^{w}iin-Kiim	big groot	TL /k^{w}ìín-kiìm/ 'huge'; FA /k^{w}iin- kiimyab/ 'fat' (adj.)
360	*cimiit *cimiis	long lang	TL /tímiít-ím/; FA /kimis-im/
361	*eiŋ	thick dik	MN /eiŋ/; TL /èèŋ/; TF /iŋ/; FA /aŋbiŋ/ ?
362	*mataK *matëK	fat (n.) vet (sb.)	MN /matak/; TF /màtàk/; WG /mitek-ote/, /biteik-o/
363	*ami	tame tam	MN /ami/; TL /àmì/; FA /ami/
364	*ciool	straight recht	TL /tòòl/; TF /tool kub/; BM /kiyoor kub/
365	*daKal *daŋkal	crooked krom	MN /rakar/; TL /dákál/; TF /dakal/
366	*beit *beis	soft, weak zacht, zwak	MN /peit/; TL /bèèt/

No.	PMO	English Dutch	Evidence
367	*citil	strong sterk	TL /tìtíl/; BM /kitir/ 'strong, hard'
368	*kook *KooK	dry droog	TF /kook-na/, /kook-nin/; cf. 373
369	*mafak *maFaK	bad slecht	TL /màfàk/; TF /mafak/; FA /mafak/
370	*bisook	empty leeg	MN /pisa/; TL /bìsoòb/ 'needlessly, empty'; FA /bisok/
371	*Fiyaab	slow(ly) langzaam	MN /fiyap/; TL /fìyaàb/; TF /fiyaab/
372	*akool *ƗKool	slow(ly) langzaam	TL /àkoól/; TF /akool-kub/; FA /akool/
373	*KooK	bitter bitter	MN /kok/; TL /kòòk/ 'hot tasting'; TF /kook/; cf. 368
374	*namaal	white wit	TL /nàmaál/; TF /nàmaàl/; FA /namaal/
375	*mitik *mitiK	black zwart	FA /mitik/
376	*citak *citaK	yellow geel	TL /titak/ 'pale brown'; TF /titak/; FA /kitak/
377	*diiŋ-	wash wassen	TL /dìíŋ-/; FA /diŋ-/; BM /riŋ-/
378	*as	song zeng, lied	MN /as-weŋ/; TL /àt/; FA /as-eŋ/
379	*wii	dance danzen	TL /wìì-/ 'bird of paradise dancing'; FA /itol wi-/; BM /wii-/
380	*as-gee	(2 men) carry on pole (2 mannen) dragen met paal	TL /àdeè .../; TF /asdee .../; FA /asgee .../
381	*dU-FU-	wake (him) up wakker maken	TL /dú-fú-/; TF /du-fu-/; FA /da-fa-/

No.	PMO	English Dutch	Evidence
382	*lak *ilak *ilaK	love liefhebben	TL /ílàk dù-/; TF /lak da-/; FA /ilak du-/
383	*fEKEEl- *baKeel-	break breken	MN /hakar-/; TL /bàkél-/; TF /bakeel-/; FA /fakel-/
384	*daka- *daKa-	ask vragen	TL /dáká-/; FA /daka-/; BM /raka-/
385	*ii-bakaa-	tell lies liegen	TL /ìì-bákà-/; TF /ii-baka-/; FA /ii-bakaa-/; cf. 180
386	*dawoog	flame vlam	TL /à-doog/; TF /as-dawog/; FA /dog/
387	*bIsu-	open (door) (deur) openen	MN /pese-/ ?; TF /basu-/; FA /bisuu-/; BM /busu-/
388	*saan-	buy kopen	TL /sààn-/; TF /saan-/; FA /saan-/
389	*wee- *ween-	buy kopen	MN /we-/; BM /wen-/
390	*finan- *Finaan-	fear bang zijn	TL /fínàn-/; TF /finan-/; FA /fiŋaan-/ ?; BM /finaan-/
391	*ba	not niet	TL /bá/; FA /ba/; BM /ba/
392	*cii	enough genoeg	TL /tìì/; TF /tii/; BM /kii/
393	*daan-	light licht, helder	TL /dààn-/; TF /daan-/; BM /raan-/
394	*sUb *sob	tomorrow morgen	TL /àm-sáb/; TF /sabi/ ?; BM /sob-kutimite/; WG /sup-ote/
395	*Isal	above boven	MN /asar/; TL /ìsál/; FA /eesal/
396	*cib	above boven	TL /tib/ 'top of a tree'; TF /tìb/; BM /tiib/; /ɛbiir kib/ 'sky'
397	*samaan	far, distant ver, veraf	TL /sàmán-ím/; TF /sàmaàn/

No.	PMO	English Dutch	Evidence
398	*sIŋkaam	far, distant ver, veraf	MN /sikeim/ ?; TL /sàkaám/; FA /sikaam/; BM /siŋaam/
399	*ilim	cloth, clothing stof, kleding	MN /ỳoum/ ?; TL /ílím/; BM /irim/
400	*beem	earthworm aardworm	MN /pem/; TL /bèém/; TF /beém/
401	*cii-	count tellen	MN /ki-/; TL /tìì-/
402	*eim *aim	pandanus pandanus	TL /èèm/; FA /aim
403	*maa..	another, the other nog een, de andere	TL /mààk/; TF /ma/
404	*tab	perhaps misschien	TL /tàb/
405	*kEl	locative marker plaatsaanduiding	TL /kal/; TF /kal/; FA /kal/; BM /ker/
405a	*k^{w}aak *k^{w}aaK	bush fowl species boskipsoort	TL /k^{w}àák/; TF /kaák/; FA /k^{w}aakeen/

2. PROTO-LOWLAND-OK

The established consonant correspondences for the Lowland-Ok languages are listed in Table 4 in the phonemic transcription of each language, and the best available examples are listed there by their Table 5 reference numbers. A list of 156 morphemes tentatively reconstructed for PLO is given in Table 5. These forms almost certainly belong to PLO, since they are based upon (a) cognates in at least 3 languages including both Division A and Division B of Lowland-Ok, or (b) a form in Division A which has a cognate in some Mountain-Ok language.

Again, the asterisked symbols in Table 4 represent proto-phones, not proto-phonemes. A phonemic analysis would include the investigation of the relationship between: *t-:*c-:*k-; -*n-:-*N-:-*nd-; -*k:-*K; -*t:-*T; *h-:initial vowel.

In a few examples initial *t, *c, and *k appear to contrast:

*tom 438	*con 495	*kon 468
*tem 546	*cet 515	*keteK 421
*tinim 502	*cim 522	

However, in 5 out of 6 examples *c is followed by a front vowel phone, whereas *t and especially *k are rarely followed by front vowel phones.

Intervocalic *n and *N appear to be in contrast, but there is insufficient data to clarify the status of intervocalic *nd. Contrastive evidence for *n and *N includes:

*kono 537	*koNo 450	*kanom, *Kanom 462	*aNo 503
*mene 548	*keNe, *KeNe 410	*tinim 502	*wiNi 516

Data are insufficient to establish the relationship between final *k and *K.

Two examples appear to indicate contrast between final *t and *T:

*wot 485	*wooT 529	*mogkot 415	*oT 431

However, there is a marked trend for *t to follow front vowel phones while *T follows other vowel phones.

The evidence suggests contrast between initial *h and initial vowel phone:

*hame- 498	*ane- 456	*hooT 409	*ok 533
*hoog 418	*on 519	*haDoob 558	*atom 509

TABLE 4. ESTABLISHED SOUND CORRESPONDENCES OF LOWLAND-OK LANGUAGES

PLO	KD	KM	YM	KN	NN	Illustrations
*b-	b	b	b	p	b	430, 439, 443, 482, 483, 490, 507
-*b-	b	mb	b	p	w	425, 432, 514
-*t	b	b	b	p	b	411, 439, 440, 480, 489, 492, 526
-*mb-	mb	mb	mb	mp	w	407, 460, 472, 481, 489, 527
*t-	t	t	t/d	t/r	t	437, 441, 442, 445, 457, 474, 478
-*t-	t	t	d	t	d	421, 463, 467, 509, 516, 528, 543
-*t	t/d	t	t	t	t	415, 437, 444, 448, 449, 470, 485
-*T	t/d	t	t	t	ø	409, 431, 454, 491, 513, 529, 534
*c-	ø	ø	ø	t	k	412, 448, 495, 515, 522, 551
*k-	k	k	k	k	k	408, 421, 425, 428, 434, 450, 454
-*K	ø/h	k	k	k	k	422, 429, 455, 487
-*ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	418, 427, 459, 461, 469, 473, 493
-*ŋk-	ŋk	ŋk	ŋk	ŋk	ŋ	415, 420, 439, 442, 445, 447, 476
*m-	m	m	m	m	m	414, 415, 422, 423, 427, 429, 453
-*m-	m	m	m	m	m	408, 433, 434, 457, 461, 478, 491
-*m	m	m	m	m	m	406, 430, 435, 436, 452, 458, 462
*n-	n	n	n	n	n	419, 479, 484, 494, 499, 540
-*n-	n	n	n	n	n	423, 435, 456, 462, 469, 473, 501
-*n	n	n	n	n	n	428, 433, 434, 443, 445, 460, 464
-*N-	nd	nd	n	n	ø	410, 450, 457, 503, 516
*w-	w	w	w	w	w	435, 459, 469, 485, 500, 506, 516
-*w-	w	w	w	w	w	470, 518, 520, 539
*y-	y	y	y	y	d	411, 433, 436, 446, 452, 504, 510
*h-	ø	ø	ø	ø	h	409, 418, 444, 498, 532, 558

LOWLAND-OK CORRESPONDENCES NOT YET ESTABLISHED

*d-	424, 549	-*k-	512
-*d-	493, 554	-*k	533
-*D-	558	*ky-	440, 471
-*nd-	559	-*y-	465
		*Y-	505, 508

TABLE 5. PROTO-LOWLAND-OK RECONSTRUCTED MORPHEMES

No.	PLO	English Dutch	Evidence
406	*kyom *yom	flesh, body vlees, lichaam	KD,KM,YM,KN /yom/; NN /gyom/, /dyom/. KM and KN mean 'flesh' only.
407	*ambo	head hoofd	KD,KM,YM /ambo-/; KN /ampo-/; NN /awo-/; in compounds for 'hair' and 'bald'.
408	*kaami	hair, feathers haar, veren	KD,KM,YM,KN /kimi/; NN /kaami/. YM, KN and NN mean 'body hair' rather than 'hair of head'.
409	*hooT	leaf blad	KD /ab-o/; KM /oo/; KN /ot/; NN /hoo/ 'leaf, hair (of head)'. Also as second morpheme in *keNe-hooT 'ear' (410).
410	*keNe *KeNe	ear oor	KM /kende/; YM /ken-oot/; KN /kene-kot/; KA /kede-kot/; NN /kee-hoo/; UT /kedn-hol/.
411	*yob	fruit, ball vrucht, bol	KD /-yob/; KM /yob/, /-yob/; YM /-yob/, /-tyob/, /-dob/; KN /yob/, /-yob/; NN /dob/ 'seed', /-dob/, /-tob/. The bound forms occur in compounds for 'eye', 'heart', 'belly', and 'testicles'. See 440 for a possible by-form.
412	*cin *cin-yob *ciNob	eye oog	KD,KM /konyob/ ?; YM /indob/; KN /tinop/ 'eye', /tin ok/ 'tears'; NN /kiob/; UT /kilob/.
413	*kyum *yum	placenta nageboorte	KM,KN /yumtom/; NN /guum/.
414	*mitu	nose neus	KD /mot-ok/ 'nasal mucus'; KM /mutu tem/ 'nostril'; KM /muut-oot/ 'nasal mucus'; NN /midu-tem/ 'nostril', /minu-koo/ 'nose'; UT /midu/ 'nose'.
415	*moŋkot	mouth mond	KD /moŋkatem/; KM /moŋkot/; YM /moŋkot-kono/; KN /moŋkot/; NN /maŋat-koo/ 'chin'.
416	*meya *miŋa	mouth mond	KM /meya kat/ 'lip'; NK /meaa-tem/; UT /miya-kad/; NN /miŋa-tem/.
417	*bon-knami	beard baard	KD /bomi/; KM /boŋ mi/; NN /ban-knami/.
418	*hooŋ	tongue tong	KD,KM /oŋ/; YM /ooŋ/; KN /oŋ/; NN /hoŋ/, /hooŋ/.

No.	PLO	English Dutch	Evidence
419	*niyi *niŋki	tooth tand	KM /niyi kondo/; YM /niŋk-ambo/ ?; KN /niŋk-ampo/ ?; NN /niŋi koo/.
420	*aŋk..	molar kies	KM /aŋkim kondo/; KN /aŋkuti/; NN /niŋi aŋo/.
421	*ketɛK	nape, neck nek, hals	KD /kete kondo/; KM /ketek-kondo/; KN /ketek kono/.
422	*muK	breast borst (uier)	KD /mu/; KM,YM,KN,NN,UT /muk/.
423	*manaa	rib rib	KM /mana kondo/; KN /mana kono/; NN /menaa ko/.
424	*dim-yob	heart hart	KM /dimyob/; NN /dimtobmyukmyuk/.
425	*kaba	belly buik	KD /kaba-yok/ 'navel'; KM /kamba yob/; YM /kaba-yom/ ?; KN /kapa/; NN /kuwa/.
426	*ini	liver lever	KM /anyi/; YM /o-ni/; KN /ini/; KA /yanya/; NN /woo-ni/.
427	*muŋ	gall gal	KM /muŋ/; KN /muŋ/; NN /muŋ/.
428	*kaambin *kaamin	navel navel	KM /kimbin/ 'umbilical cord'; YM /kimbin-ko/; /tana kibin/ 'placenta'; KN /kipin/; NN /kaamin kwoo/.
429	*maK	shoulder schouder	KD /ma kondo/; KA /ben-mak/; NN /tani-mak/.
430	*bim	buttocks achterste,billen	KD /em-bim/; KM /em-bim/; NN /o-bim-dyom/.
431	*oT	excreta poep,drek,stront	KM /amb-ot/ 'brain'; YM /ot/; KN /ot/; NN /o/, /wo/.
432	*kabu	testicles testikel	KN /kupu yop/; NN /gabu/.
433	*yamun	urine pis	KD /yumu/; KM,YM, KN /yumun/; NN /damun/.
434	*kemen	lime kalk	KD /kemen kondo/ 'gourd as lime container'; KM,YM,KN /kemen/.

No.	PLO	English Dutch	Evidence
435	*wonam	grass apron vr. schaambedekking	KD /bonom/ 'grass apron', /wonom/ 'rushes'; NN /wonam/.
436	*yon	foot, leg voet, been	YM,KN /yon/; NN /don/; UT /lon/.
437	*tat	sole, palm voetzool, handpalm	KM /kondo tat/ 'sole'; YM /tiŋki-dat/; NN /don-tat/ 'sole'
438	*tom	joint gelid	KD /-tom/; KM /-tom/; YM /-dom/; KN /-tom/, /-rom/; NN /-tom/. Occur in compounds for 'elbow', 'knee', 'heel'.
439	*buŋkub	joint gelid	KN /puŋkuwot/ 'elbow'; YM /buŋkumat/ 'elbow'; NN /don-buŋub/ 'knee'; UT /buŋub/ 'knee'.
440	*kyob	crown, muscle kruin, spier	KD /kob/, /-kob/; KM /-kob/, /-yob/; KN /-kop/, /-yop/; NN /-kob/. Bound forms occur in compounds for 'biceps', 'calf', 'thigh'. See 411 for a possible by-form.
441	*tani	arm, hand arm, hand	KN /tini/; NN /tani/.
442	*teŋki	arm, hand arm, hand	YM /tiŋki/; UT /teŋi-ŋuŋ/ 'hand'.
443	*ben	arm arm	KD /ben/; KM /ben/ 'hand, arm'; KN /pen-rom/ 'elbow'
444	*het	seven zeven	KN /et/; NN /het/; /tani het/ 'forearm'.
445	*taŋkon	armpit oksel	YM /doŋkon/; KN /toŋkon tem/; NN /taŋoon/.
446	*yik *yiK	thorn doorn	KM /yuk/; KN /yik/; NN /ą̱ dik/.
447	*aŋko	thumb, big toe duim, grote teen	KD,KM,YM,KN /aŋko/; NN /aŋo/.
448	*ceet	little finger pink	KD /ben et/; KM /eet/; YM /eet/; KN /teet/.
449	*ketket *Ketcet	little finger pink	KN /ketet/; NN /ketket/.

No.	PLO	English Dutch	Evidence
450	*koNo	bone been,knook,gebeente	KD,KM /kondo/; YM,KN /kono/; NN /kwoo/; UT /kodo/.
451	*koNo	leg, foot been,poot,voet	KD,KM /kondo/; NN /koo-hai/ 'shin', /koo-mee/ 'back of knee'. KA /kono
452	*yam	blood bloed	KD /yab/ ?; KM,KN /yam/; NN /dam/; NK /lam/.
453	*meTmeT *mekmek	tendon, vein pees, ader	YM /mekmet/; KN /mekmek/; NN /meemee/.
454	*kaT	skin, bark huid,vel,schors	KD /kad/; KM,YM,KN /kat/; NN /kaa/; UT /kad/.
455	*..moK	spittle, spit speeksel,spuwen	KD /bumoh/; KM /kamok/, /bumok/; YM /kamok/; KN /pumok/.
456	*ane-	eat, drink eten, drinken	KM /anye-/; YM /anei/; KN /ane-/; NN /ena/, /in-/.
457	*tamoNe-	bite bijten	KD /tomondon/; KM /tomonde-/; KN /tomone-/; NN /tamoi/; /tamontai/ 'chew'.
458	*..yum	dream dromen	KM /kimbiyum/; YM /kiium/; KN /anyum/; NN /dum/.
459	*weŋ	voice stem	YM /weŋbob/; KN /weŋ/; NN /weŋ/.
460	*ambon	laugh lachen	KM /adambon mee-/; YM /ambon/; KN /ambon kamee-/.
461	*ameŋ	cry, weep schreien,wenen	YM /ameŋ/; KN /ameŋ kamee-/.
462	*kanom *Kanom	cough hoesten	KM /konom kadan-/; /konom kiit/ 'phlegm'; YM /konom/; KN /konom/ 'phlegm'; NN /kanom/.
463	*atan *atam	belch, burp boeren	KM /atan taade-/; KN /atam taare-/.
464	*yin *Yin *kyin	a boil steenpuist	KD /yin/ 'ulcer'; KM /yiŋ iŋka-/; KN /yin kee-/.
465	*koyu	young woman jonge vrouw	KD /kayu/; KM /koyu/.

No.	PLO	English Dutch	Evidence
466	*ka *Ka	person, people mens(en)	KM /ka kidi/ 'corpse' (dead person); KN /ka/ 'man'; /ka pop/ 'corpse'; NN /ka/ 'man'; UT /kaa/ 'man'.
467	*katuk *katub	man man	KD /katuk/ 'person', /tana kutub/ 'boy'; KM /katuk/; YM /kaduk/, /kadub/; KN /katuk/; KA /katub/; NN /kadub/.
468	*kon	woman vrouw	KD /kon-kewet/ 'girl'; KM /kon/; NN /kwon/; UT /koon/.
469	*wonoŋ	woman vrouw	YM /wonoŋ/, /wunuŋ/; KN /wono/, /wonoŋ/, /wunuŋ/; KA /wodoŋ/.
470	*ka-kewet	bachelor jongeling,jonkman	KD /kewet/; KM /kewet/; KN /kewet/, /kakewet/.
471	*kyoom	old man oude man	KD /kambadi/; KM /kyoombadi/; YM /yoom/; /wonoŋ-kiyoom/ 'old woman'; KN /yoom/; KA /kiyom/.
472	*ambe	father vader	KD,KM,YM /ambe/; KN /ampe/.
473	*enaŋ	mother moeder	KD /ena/; KM /enaŋ/; YM /ena/; KN /naŋ/; NN /neŋ/.
474	*tena	child,descendant kind,afstammeling	KD,KM,YM,KN /tana/; NN /tena/; UT /tina/.
475	*mun..	child kind	KM /mun/; /muŋk-an/ 'daughter'; KN /muŋk-an/ 'daughter'.
476	*miŋki	child kind	KM,KN /miŋki/ 'son'; NN /tina miŋgi/ 'grandchild'.
477	*-an	feminine vrouwelijk	KM,KN /-an/; NN /on-an/ ? 'elder sister'.
478	*taman	younger sibling jongere sibling	KM,YM,KN,NN /taman/.
479	*niŋki	younger brother jongere broer	KM /niŋki/; NN /niŋi/.
480	*moNob *mondob	grandchild kleinkind	KM /mondob/; KN /monop/.
481	*ambii	husband echtgenoot	KD /ambi/; KM,YM /ambii/; KN /ampii/; NN /awi/.

No.	PLO	English Dutch	Evidence
482	*bat *baT	sibling-in-law schoonsibling	KM /bat/; KN /pat/.
483	*bon	ceremony feest	KN /-pon/ as final element in names of specific ceremonies.
484	*ne..	friend vriend	KN /eke/, /neke/; NN /ne/, /ne-it/.
485	*wot	drum trom	KD /wod/; KM,YM,KN,NN /wot/.
486	*am	house huis	KM /am ada/ 'stairs'; KN /am naat/ 'well'; NN /am/, /ąm/; UT /aam/.
487	*kuK	fence omheining	KD /ku/; KM /kuk/.
488	*wuut *wuuT	fence omheining	YM /wuut/; KN /uut/.
489	*ambib	house huis	KD /ambib/ 'house, village, yard'; KM,YM /ambib/; KN /ampip/.
490	*-bon	place plaats	KD /am-bon/ 'house', /yombom-bon/ 'garden'; KM /amkom-bon/ 'mountain', /akodo bon/ 'forest'; YM /kot-bon/ 'mountain'; KN /yoŋ-pon/ 'garden', /-pon/, /-pun/ in place names; NN /dumin-bon/ 'below', /okmaan-bon/ 'island', /-bon/ in place names.
491	*amoT	fire vuur	KD,KM /amo/; YM,KN /amot/.
492	*wib	smoke rook	KM /amo iib/; NN /wib/.
493	*kadadaŋ	bush knife kapmes	KM /kadaŋ/; YM /kaddaŋ/ ?; KN /kararaŋ/; NN /kananaŋ/.
494	*neŋka-	bake, roast bakken, poffen	KD /neŋkem/; KM,KN /neŋka-/; NN /naaŋae/.
495	*con	fish vis	KD,KM,YM /on/; KN /ton/; NN /tyon/, /kyon/.
496	*om	sago sago	KD,KM,YM,KN,NN /om/.

No.	PLO	English Dutch	Evidence
497	*tabuK	tobacco tabak	KD /abu/; KM /abuk/; YM /aub/, /yaub/ ?; KN /tau/, /took/; NN /tawuk/. See also 110. This present set of words shows few regular correspondences, and thus betrays a probable borrowing. *tabuK is not a reconstruction in the normal sense but rather a guess at the form of the source of the borrowing.
498	*hame-	plait vlechten	KD /emen/; KN /emee-/; NN /hamende/; /haami/ 'weave'.
499	*noŋ	rope, rattan touw, rotan	KM,YM,KN,NN /noŋ/.
500	*wi..	cut, fell (om)hakken	KM /wine-/, /wiee-/; KN /wiine-/; NN /wi/.
501	*manat	lance, spear lans	KD /mandak/ ?; KM,YM,KN,NN /manat/.
502	*tinim	bow boog	KD,KM,KN,NN /tinim/.
503	*aNo	arrow pijl	KD,KM /ando/; YM,KN /ana/; NN /aa/.
504	*yoŋ	garden, farm landbouw,tuinbouw	KD /yom-bombon/; YM /yom-bon/; KN /yoŋ-pon/; NN /doŋ/.
505	*Yamu	ripe rijp	KD /yumu/; KM /yamu/; YM, KN /yumu/; NN /namu/.
506	*wan	yam broodwortel	KD /wan/ 'sweet potato'; KM,YM,KN /wan/.
507	*boteŋ *bonteŋ	sweet potato zoete bataat	YM /boteŋ/, /botaŋ/, /bonden/; KN /ponreŋ/; NN /bodeŋ/; UT /boneŋ/. These forms are rather irregular and may signify a loan word. Some botanists believe that this plant was introduced to New Guinea from South America about 300 years ago.
508	*Yamen	taro keladi, tales	KD,KM,YM,KN /yemen/; NN /namen/; NK /lamen/.
509	*atom	coconut kokos, klapper	KD,KM /atom/; YM /odom/; KN /otom/; NN /otom/.

No.	PLO	English Dutch	Evidence
510	*yum	banana banaan.	KD,KM,YM,KN /yum/; NN /dum/; NK /dyuum/; UT /dyum/.
511	*amob	taboo taboe	YM,NN /amob/; KN /amop/.
512	*oket	bamboo bamboe	YM,NN /oket/; KN /owet/.
513	*aT	tree, wood boom, hout	KD /ab/ ?; KM,YM,KN /at/; NN /ạ/; UT /a/.
514	*kubi	root wortel	KD /a-kibi/; KM /a kimbi/; YM /kibikab/; KN /kipikap/; NN /ạ kuwi/.
515	*cet	flower bloem	KM /et/; KN /tet/; NN /ạ ket/.
516	*wiNi	egg ei	KM /windi/; YM /wini/; KN /wini/; NN /on i/.
517	*kutim	crown pigeon kroonduif	KM,KN /kutim/; YM /kodim/; NN /on-kidim/; NK /on kinim/.
518	*kewet	hornbill neushoornvogel	KM,YM,KN /kewet/.
519	*on	bird vogel	KD,KM,YM,KN,NN /on/.
520	*yawom	flying fox vliegende hond	KM /yowom/; YM /on yowom/; KN /yowom/ 'bat'; NN /on-dawom/.
521	*meen	string bag (draag)net	KD,YM,KN,NN,NK,UT /men/; KM /meen/.
522	*cim	head louse luis	KD,KM /im/; YM,KN /tim/; NN,NK,UT /kwim/.
523	*min	star, firefly ster, vuurvlieg	KM /minoo/; YM /mindoŋ/ 'star', /minot/ 'firefly'; KN /minkon/ 'firefly'; NN /min/.
524	*inub *anuk	snake slang	KD /anub/; KM /anuk/, /anyuk/; NN,NK /inub/.
525	*kot *koT	frog kikvors	KN /kot/.

No.	PLO	English Dutch	Evidence
526	*bedeb *beneb	crocodile krokodil	KD /ayu-beneb/; KM /ayi bedeb/; YM /beneb/; KN /penep/; NN /adim-badeb/.
527	*ambom	tortoise, turtle schildpad	KM /ambom/; KN /ampom/; NN /awom/.
528	*aton	sun zon	KD,KM,KN /aton/; YM,NN,UT /adon/.
529	*wooT	moon maan	KD /wod/; KM,YM,KN /woot/; NN /woo/.
530	*am	rain regen	KD,KM,YM,KN /am/. See 552.
531	*bim	earthquake aardbeving	KM,NN /bim/.
532	*huub	wind wind	KM /ub/; YM /nub/ ?; KN /am uup/, /up/; NN,UT /huub/.
533	*ok	water, river water, rivier	KD,KM,YM,KN,NN /ok/.
534	*boT	stone steen	KD,KM,YM /bot/; KN /pot/; NN /boo/; UT /but/.
535	*tum *tuum	stone steen	KN /tum/ 'stone nose ornament'; UT /tuum/.
536	*ok-yiin	sand zand	KA /okyin/; KN /ok yiiɣ/; NN /okdiin/.
537	*kono	boat prauw	KM,KN,NN /kono/; YM /konoo/.
538	*kaun	heavy zwaar	KD /kun/; KN /kuun/; NN /kaun/ 'heavy', 'strong'.
539	*howoɣ.. *owoɣ..	light (weight) licht (niet zwaar)	KM /oɣkoɣ/; KN /oɣɣpen/; KA /howoɣab/.
540	*namin	hot warm	KD, KM /nimin/; NN /namin/.
541	*kok *koK	dry droog	KA,KN,NN /kok/.

No.	PLO	English Dutch	Evidence
542	*kook *kooK	bitter bitter	KM /kok/; YM,KN /kook/; NN /kok/.
543	*mitik *mitiK	black zwart	KM /mitiboob/ ?; /mitik/ 'night, dark'; KN /mitikni-kono/.
544	*..teme *..keme	see zien	KM /teme-/; KA /akme/; KN /wetme-/; NN /aakme/.
545	*baakdi..	break breken	KM /baakdibe-/; KN /paakripe-/; NN /bokni/.
546	*tom	hole, in gat, in	KD /moŋka-tem/ 'mouth'; KM /mutu tem/ 'nostril'; KA /moŋko-tem/ 'mouth'; KN /tem/ 'in'; NN /tem/ 'hole in ground'.
547	*one *wene	go, walk gaan, lopen	KD /wenem/ 'walk', /wonon/ 'go'; KM,KN /wene-/ 'leave'; KA /wene/ 'walk', /wodon-/ 'go'; NN /une/ 'go', /onem/ 'walk'. ('Go' and 'walk' separate?)
548	*mene	come komen	KD,KM,KA,KN /mene/; NN /made/.
549	*do..	nothing niets	KD /dowan/ 'no'; KM /doan/; YM /do/, /dowam/ 'no'; KN /noo/; NN /duam/.
550	*bain	not niet	KM /bain/; NN /ben/.
551	*ciib	enough genoeg	KM /iib/; KN /tiip/.
552	*am	day, weather dag, weer	KD,KM,YM,KN,NN /am-/ in compounds for 'thunder, lightning, night, cloud, sky'. See 530.
553	*taman	far, distant ver, veraf	KN /taman/; NN /aam-taman/.
554	*idim	cuirass (borst)harnas	KM,YM /idim/; KN /irim/.
555	*kumit	cucumber komkommer	YM /kumwit/, /kimit/; NN /kumit/. The reflexes are mostly regular. See 202.
556	*aim	pandanus pandanus	YM /aim/, /em/; NN /im/.

No.	PLO	English Dutch	Evidence
557	*mimo *moim	one een	KD,KM,YM,KN /mimo/; NN,NK /moim/.
558	*haDoob	two twee	KD,KM /adob/; YM,KN /ayoob/; NN /hadob/.
559	*kwandin *kwandiŋ	four vier	KD,KM /kandin/; YM,KN /kaniŋ/; NN /kwandin/; UT /kwandiŋ/.
560	*maa	another, the other nog een, de andere	KM,KN /maa/; NN /ma/ 'one'.
561	*ateb	perhaps misschien	KM /ateb/; KN /atep/.

3. PROTO-OK

No attempt is made here to reconstruct Proto-Ok, but the direction that such an attempt might take is indicated. A list of possible cognate sets for Proto-Ok is given in Table 6, in which Proto-Mountain-Ok (PMO), Proto-Lowland-Ok (PLO) and Sibil (NS) are matched. Occasionally an extant language form is given in one of the columns instead of a reconstruction, and the language named in the reference column.

(a) Whereas many words terminate in a consonant in both PMO and PLO and may presumably be reconstructed with a final consonant in PO, several words terminate in a vowel in PLO and in a consonant in PMO (the latter being the shorter form) and should probably be reconstructed with a final vowel in PO: items 571, 573, 579, 584, 594, 617, 620, 622, 643, 645, and 653.

(b) Final *T in PLO corresponds to final *l in PMO in items 587, 598, 599, 636, 660, and 668.

(c) NS initial /s/ for PMO and PLO *c, *t, or *k may be seen in items 563, 565, 671, and 692. All of these occurrences are followed by /i/ in NS, and further investigation of this may throw light on the question of whether *c may prove to be an allophone of */t/ or */k/ in PO.

(d) PMO *k and *K correspond to both PLO *k and *K indiscriminately, and this lends weight to the suggestion that *k and *K are allophones in PMO and also in PLO.

(e) PLO initial *k corresponds to lack of *k in PMO in items 694, 695, and 696.

(f) NS final /n/ corresponds to PMO and PLO final *n in items 569, 635, 657, and 663; NS final /l/ corresponds to PMO and PLO final *l in items 626, 631, and 667; but NS final /l/ corresponds to PMO and PLO final *n in items 565 and 609.

In addition to the data in Table 6, most of the pronouns, subject suffixes and object prefixes presented in the "Survey" (Tables 3, 4, and 5) lend themselves to the reconstruction of PMO and PLO forms, and ultimately PO forms.

TABLE 6. POSSIBLE COGNATE SETS FOR PROTO-OK

No.	PMO	PLO	NS	English	References	
562	*dam	*kyom	--	body	212	406
563	*ciloog	kidog	silog	ear, eleven	214	NN
564	*lab *loob	*yob	--	seed, ball	326	411
565	*ciin	*cin	sil	eye	6	412
566	*lom *lum	*kyum *yum	--	eyelid, placenta	215	413
567	*mUtUUm *mutuum	*mitu	--	nose	7	414
568	*magkat	*mogkot	--	mouth	216	415
569	*boon	*bon-	bon	jaw, mouth	9	417
570	*foog	*hoog	--	tongue	11	418
571	*nig *niig	*niyi *nigki	--	tooth	12	419
572	*agko..	*agk..	--	molar	13	420
573	*teig *taig	*tegki	--	hand, arm	239	442
574	*bin	*ben	--	hand, arm	39	443
575	*feet	*het	--	forearm	41	444
576	*kum *KUm	kum	kum	side of neck	219	NN
577	*tAgkan	*tagkon	--	armpit	44	445
578	*duk *gUK	*yik *yiK	--	spike	323	446
579	*awooK	*agko	--	thumb, big toe	46	447
580	*gitak *gitaK	*keteK	--	nape, neck	15	421
581	*muuk	*muK	--	breast	16	422
582	*mëlën	*menaa	--	rib	17	423

No.	PMO	PLO	NS	English	References	
583	dimnoob	*dim-yob	--	heart	FA	424
584	*in	*ini	--	liver	223	426
585	*maaK	*maK	mak	shoulder	226	429
586	*biim	*bim	--	buttocks	227	430
587	*ool	*oT	--	excreta	27	431
588	*yemaan	*yamun	--	urine	30	433
589	*Këmeen	*kemen	--	lime, gourd[9]	31	434
590	*wanëm	*wonam	wunom	grass apron	32	435
591	*yaan *yëën	*yon	—	foot, leg	34	436
592	*bukUb *buKub *buŋkub	*buŋkub	bangup	wrist, elbow, knee	232	439
593	*CAtKët	*ketket *Ketcet	—	little finger, toe	47	449
594	*kun *kuun	*koNo	--	bone	48	450
595	*kun *kuun	*kaun	--	strong	48	538
596	*daam *gaam	*yam	—	blood	242	452
597	*tui..	--	ti	biceps, nine	238	---
598	*melmeel	*meTmeT *mekmek	--	tendon, vein	50	453
599	*kaal	*kaT	—	skin, bark	51	454
600	*mook *mooK	*..moK	—	spittle	244	455
601	*wan-	*ane-	nammam	eat, drink	53	456
602	*lOm *lëm	*..yum	—	dream	57	458
603	*weeŋ	*weŋ	—	voice	60	459
604	*abën	*ambon	--	laugh	61	460

No.	PMO	PLO	NS	English	References	
605	*"amë-	*ameŋ	---	cry, weep	62	461
606	*itam *itaŋ	*atam *atan	---	hiccup	247	463
607	*luin	*ṿin *Ÿin *kyin	---	a boil	70	464
608	---	*ka *Kaa	kaka	man, person	---	466
609	*kan *kun	*kon	kul	female	255	468
610	*wan^{ll}ŋ	*wonoŋ	wenaŋ	woman	78	469
611	*imOK	---	im	husband	79	---
612	*k^{w}eet *KabKees	*ka-kewet	---	bachelor	256 257	470
613	*usoom *isoom	*kyoom	---	old man	258	471
614	*moom	mom	mom	mother's brother	260	KN
615	*tën	*tena	tena tenna	child	261	474
616	*mën	*mun..	---	child	85	475
617	*miin	*miŋki	---	child	86	476
618	*aul	---	ol-ki	child, ancestor	262	---
619	*baab	baab	baab	my elder brother	263	NN
620	*fiK	hiki	pik	his elder brother	89	NN
621	*een	*-an	---	elder sister	264	477
622	*niiŋ	*niŋki	niiŋ	younger brother	90	479
623	*neeŋ	niŋkam	neeŋ-kul	younger sister	91	KM
624	*mulub	*moNob *mondob	---	grandchild	265	480
625	*baat *baas	*bat *baT	bas baas	sibling-in-law	266	482
626	*kabeel *Kabeel	---	kabeel	parallel cousin	269	---

No.	PMO	PLO	NS	English	References	
627	*bën *ban *bOn	*bon	---	ceremony	278	483
628	*naiK	*ne..	---	cross-cousin	271	484
629	*woos	*wot	wot	drum	96	485
630	*am	*am	-aam -am	housė	97	486
631	*yowool	---	iwool	ceremonial house	281	---
632	*kuk *KoK	*kuK	---	wall	286	487
633	*watŭ	*wuut *wuuT	---	fence	99	488
634	*ŭbiib	*ambib	abib	village	101	489
635	*baan	*bon	-bon -pon	place	287	490
636	*mool	*amoT	---	fire, embers	288	491
637	*iib	*wib	---	cloud, smoke	291	492
638	*kalaleeŋ *Kalaleeŋ	*kadadaŋ	---	bush knife	297	493
639	*oom	*om	om 'taro'	sago	109	496
640	*faa-	*hame-	---	plait	111	498
641	*wi- *wii-	*wi..	---	cut, fell	302	500
642	*tinim *cinim	*tinim	---	bow	305	502
643	*wan	*aNo	---	arrow	116	503
644	*loŋ	*yoŋ	---	garden, farm	311	504
645	*yOm	*Yamu	---	ripe	118	505
646	*wnan	*wan	---	sweet potato, yam	120	506
647	---	*boteŋ *bonteŋ	boneŋ	sweet potato	---	507
648	*yemën	*Yamen	---	taro	121	508

No.	PMO	PLO	NS	English	References	
649	*suum	*yum	tom	banana	123	510
650	*ookeet *ooKees	*oket	--	water container bamboo	320	512
651	*as	*aT	--	tree, wood	127	513
652	*cait *cais	*cet	--	flower	131	515
653	*win	*wiNi	--	egg	135	516
654	*kaweel *KƁweel	*kewet	--	hornbill	141	518
655	*awoon	*on	--	bird	143	519
656	*yoon	*yawom	--	flying fox	335	520
657	*meen	*meen	men	string bag	145	521
658	*cim	*cim	--	head louse	146	522
659	*inab *inɛ̄b	*inub *anuk	--	snake	149	524
660	*kool *Kool	*kot *koT	kol	frog	152	525
661	abom	*ambom	--	tortoise, turtle	FA	527
662	*ƁtaaN	*aton	--	sun	154	528
663	*bakan *baKon	ambukin	bakon	ground	345	KM
664	*oom *woom	*am	--	rain	346	530
665	*bim	*bim	--	earthquake	157	531
666	*ook	*ok	ok	water, river	158	533
667	*biil	--	-bil	valley	161	---
668	*bool	*boT	--	stone, ground oven[10]	163	534
669	*tuum	*tuum *tum	tum	stone	164	535
670	*dindin	*ok-yiin	--	sand	358	536

No.	PMO	PLO	NS	English	References	
671	*cimiit *cimiis	--	simit	long	360	---
672	*foog	*howog *owog	--	light (weight)	170	539
673	*mImin *mAmin	*namin	--	hot	173	540
674	*kook *KooK	*kok *koK	--	dry	368	541
675	*KooK	*kook *kooK	--	bitter	373	542
676	*mitik *mitiK	*mitik *mitiK	--	black, dark	375	543
677	*-tëm-	*..teme *..keme	--	see	182	544
678	*baKeel- *fEkEEl-	*baakdi..	--	break	383	545
679	*teem	*tem	--	hole, in	184	546
680	*ume-	*one *wene	onim-onim	go, walk	185	547
681	da	*do..	doo	not	TF	549
682	*cii	*ciib	--	enough	392	551
683	*am	*am	--	day, weather	191	552
684	*samaan	*taman	--	far, distant	397	553
685	*ilim	*idim	--	cloth, cuirass	399	554
686	*cimit	*kumit	--	cucumber	202	555
687	*eim *aim	*aim	--	pandanus	402	556
688	áloòb	*haDoob	--	two	TL	558
689	*maa..	*maa	--	(an)other	403	560
690	*tab *cab	*ateb	--	perhaps	404	561
691	*soo	--	-son	and, with	221	---
692	*tikiin *tiKiin	--	-sikin	mountain	354	---

No.	PMO	PLO	NS	English	References	
693	*koon	*hooT	-- ✓	hair	4	409
694	*abin	*kaambin *kaamin	--	navel, umbilical cord	23	428
695	*abu-	*kabu	--	testicles	29	432
696	*soi..	*koyu	--	young woman	81	465

4. ARCHAIC OK

The material that was culled in arriving at PMO and PLO reconstructions included some tantalizingly similar pairs of words that differed by the presence or absence of an intervocalic /l/, /k/, /ŋ/, /w/ or /y/. However, these differences were not systematic, and sometimes the two forms occurred in the same language. It is suggested that it may be possible to apply the methods of internal reconstruction to this material to arrive at a single form at an earlier stage of the parent language than Proto-Ok, and this might perhaps be termed Archaic Ok.[11] Since infixing is unknown in any of the living languages, it is likely that loss of the intervocalic consonant has occurred, and the longer form better represents Archaic Ok. The examples are listed below without further comment.

NN /wali/; UT /wai/ 'rain'

TL /àfálík/ 'male ancestor'; TL /àfeék/ 'female ancestor'

PMO 275 *kulu-,*KUlU- 'marry'; PMO 274 *ku-,*KU- 'marry'

TL /nala-/ 'I'; TL /na-/ 'I', and other pronouns in MO languages

PMO 213 *kaliim,*Kalim; PLO 408 *kaami 'hair'

PMO 83 *aalɵb; PLO 472 *ambe 'father'

FA /falaŋ/, TF /filaŋ/; PMO 11 *fooŋ 'tongue'

KM /badin/; KM /bain/ 'not' (KM intervocalic /d/ corresponds to PMO *l.)

PMO 341 *sUluub; KM /oktuup/, NN /tueb/ 'cockroach'

PMO 345 *bakan,*baKon 'ground'; PMO 287 *baan, PLO 490 *-bon 'place'

PMO 272 *bɵKeel,*bɵŋkeel; PMO 273 *saKbal,*sakbal, KN /per/ 'ghost'

PMO 167 *tukul,*tUKUl; NN /tuu/, UT /tul/ 'fat'

TF /wakal-/ 'star'; PLO *wooT 'moon'

TL /tú̀kuù̀ŋ/; NS /toŋ/ 'firestick, matches'

TL /tì̀kíb/, NS /sikip/; PMO 392 *cii, PLO 551 *ciib 'enough'

TL /kòkòn-/; PMO 246 *koon-, *Koon- 'cough'

FA /bakɑlaaŋ/; PMO 65 *ci-bIlnE̋ŋ 'belch'

TF /dakaŋ/; PMO 73 *geeŋ 'scratch oneself'

PLO 419 *niŋki; *niyi 'tooth'

NN /niŋɔb/; NK /neoob/ 'dog'

PLO 416 *mina; *meya 'mouth'

PMO 156 *tawaal 'ground'; PMO 165 *tool 'mud'

PMO 331 *mAyaan, *mIyaan; FA /maan/

FA /mayaak/, BM /mayak/; PMO *226 *maaK 'shoulder blade'

In a personal communication F.C. Horne mentioned that Ngalum at Kiwirok has long vowels which are often the result of the loss of intervocalic /l/. This suggests that a close examination of Ngalum and Sibil may throw more light on this Archaic Ok phenomenon.

5. CONCLUSION

Very few studies have been made of sound correspondences in New Guinea languages.[12] The present study helps to rectify this lack for one group of languages in the centre of the island. In sections 1 and 2, the existence is demonstrated of sound correspondences that are as regular as might be expected from data of only mediocre quality. Some indication is given of how these correspondences may eventually be grouped into proto-phonemes.

To provide more cognate sets and more accurate correspondences, it is desirable that Wagarabai, Ninggirum, and Upper Tedi be studied further and extensive phonemicized word lists obtained. When this is done, and when data are available from at least two Ngalum "dialects", it should be possible to identify regular sound correspondences for Proto-Ok, and to reconstruct some of its morphemes.

In the "Survey" the status of Sibil within the Ok Family was left rather uncertain. It was suggested that it may prove to be either a third division of the Mountain-Ok Sub-Family, or a third separate sub-family. The cognates listed in section 3 of this present paper suggest that Sibil has more similarity with Mountain-Ok than with Lowland-Ok in that it also shows loss of the word-final vowel. However, four of the likely PO sound correspondences exhibit Sibil reflexes that are different from both PMO and PLO, and this points to the classification of Sibil as a third sub-family as the better choice. The four correspondences (PMO:PLO:NS:example) are: *s-:*y-:/t-/:649; *c-:*c-:/s-/:565; *f-:*h-:/p-/:620; -*n:-*n:/-l/:609.

NOTES

1. The Ok Family consists of at least ten languages which have been grouped into two sub-families. See Alan Healey, A Survey of the Ok Family of Languages, 1964 (mimeo): pp. 38-45. Note especially the abbreviations for language names on p.39.

2. Berg 1950 suggests the occurrence of morpheme allomorphs is a disturbing factor in the identification of cognates and sound correspondences.

3. Bright 1956 adopted this same standard.

4. A. Healey 1964 (b), section 6.

5. For the sake of brevity a proto-form is sometimes said to occur in living languages by which it is intended to imply that the reflexes of the proto-form occur in the living languages.

6. The aspect markers /-l/ and /-m/ are omitted from verb stems and their reconstructions, but all other stem-final consonants are retained.

7. WG forms have sometimes been quoted with unmarked endings such as /o/, /ote/ and /ite/.

8. Where a consonant cluster containing a morpheme boundary has been reduced to a single consonant by sandhi, the hyphen is placed either before or after that single consonant, whichever best illustrates the morpheme under discussion.

9. Gourds are used as lime containers in the lowland areas and as penis covers in the mountain areas.

10. A ground oven consists of food heaped over heated stones and then covered.

11. Chafe 1959.

12. The only such studies the author has seen are: Capell 1943, Wurm 1951, Drabbé 1953: 87-88, Bromley 1961, Young 1962, and Laycock 1962: 202-5.

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TELEFOL PHONOLOGY

0. INTRODUCTION

At first glance the phoneme inventory and phonological structure of *Teléfól* appear to be relatively simple.[1] However the phonemic analysis of this language has proved surprisingly difficult, and cannot yet be said to be complete even after almost five years of continuous study. Two phenomena lie behind this resistance to analytical procedures.

Firstly, as in many languages with just two prosodemes at the lexical level, the two tonemes of *Teléfól* have a wide range of allophones.[2] Because of this, they were not easy to identify, especially when viewed through the traditional framework of pitch registers or pitch contours. It was only when the idea of pitch steps was conceived and applied that the tonemic system was seen with clarity and consistency. (See section 10.)

Secondly, several kinds of distributional asymmetry or neutralization tended to reduce the author's confidence in the accuracy of his phonetic data and the analysis based upon it, thus paralyzing analytical progress. It was only as each type of neutralization was recognized and deliberately investigated that optimism and progress returned. Neutralization of length is discussed in sections 2. and 2.3, of /b/ and /w/ in 4.3, of short vowels in 6., of tonemes in 7.7, and of juncture in 8.4.

The *Teléfól* language is spoken by some 4000 people living in the vicinity of Telefomin, Territory of New Guinea.[3] The people living in the *Ifítáman*, *Ilibtaman*, and *Nínátáman*

valleys all call themselves *Teléfólmiín* and speak several very similar dialects. This paper employs the dialect of the *Káyalikmiín* parish (or clan) who live in the *Ifítáman* valley within two miles of the Telefomin administrative centre. In addition to the *Teléfólmiín*, the people who call themselves *Fálamiín* and who inhabit the headwaters of the Sepik River (*Ok Tíkín*) also speak a dialect of the *Teléfól* language.

The data presented in this paper were obtained during 27 months' residence at Telefomin under the auspices of the Summer Institute of Linguistics and the Australian National University, from 1959 to 1963. The two principal informants were *Miyoméngaal (Ílinokál)* and *Háákkis (Tiínokál)*, both young men of the *Káyalikmiín* parish in their early twenties who have had considerable contact with Neo-Melanesian (Pidgin English). The author is indebted to K.L. Pike for assistance in the analysis of tone, and to S.A. Wurm for a detailed criticism of an earlier draft of this paper.

1. SYLLABLE AND WORD PATTERNS

There are eight types of syllable in *Teléfól* which may be represented by the general formula: (C)V(V)(C). A word consists of from one to six or more of these syllables in sequence.

1.1 SIGNIFICANT CONSONANTAL POSITIONS

The discussion of consonants is best handled in terms of their position with respect to the syllable. The SYLLABLE-INITIAL position includes the word-initial position and the second member of word-medial consonant clusters. The SYLLABLE-FINAL position includes the word-final position and the first member of word-medial consonant clusters. The INTERVOCALIC position cannot be satisfactorily aligned with either the syllable-initial or syllable-final position, and as it has certain characteristics peculiar to itself, it has been set up as a separate significant position.

1.2 LONG AND SHORT SYLLABLE-NUCLEI

The vocalic nucleus of a syllable may consist either of one vowel phoneme or of two identical vowel phonemes. Such geminate vowels have been regarded as constituting the nucleus of a single syllable, firstly because they consist, phonetically, of a single vocoid of approximately $1\frac{1}{2}$ moras length as compared with a nucleus of a single vowel in an

analogous context, this long vocoid showing no marked features of rearticulation. Secondly, there are no comparable sequences of two diverse vowels bounded on either side by consonants. Apart from a few loan words, the only sequences of diverse vowels observed thus far involve at least three vowel phonemes, two of which are the same, and there is a morpheme boundary at the vowel change point. Some contrasting examples of long and short syllable nuclei are presented below.

/dàl/	'kidney'; 'purlin'	/dààl/	'bamboo sp.'
/fàl/	'tree sp.'	/fààl/	'door', 'barricade'
/nàm/	'yam sp. (red)'	/nààm/	'cane cuirass'
/sàŋ/	'salt cone'	/sààŋ/	'grass sp. (skirt-making)'
/bùŋ/	'splinter (in flesh)'	/bùùŋ/	'fungus sp. (edible)'
/dùm/	'fruit'	/dùùm/	'faded', 'brown'
/kùm/	'side of neck', 'eleven'	/kùùm/	'tree sp.'; 'castor oil tree'
/bìl/	'wages (food)'	/bìil/	'arrow shaft'
/dìl/	'dusky lory (parrot)'	/dìil/	'cold (weather)'
/ìb/	'dry sand', 'dust'	/ìib/	'centre'
/tìm/	'head-louse'	/tìim/	'trunk (tree)', 'antinode (bamboo)'
/yál/	'marita sp. (red screwpine)	/máál/	'garoka sp. (nutty screwpine)'
/kúl/	'hand'	/fúúl/	'cured (food)'
/tít/	'bridge supports'	/íít/	'above'
/àbál/	'veranda'; 'tree fern sp.'	/àbaál/	'tasty', 'sweet'
/àlál/	'garden rubbish heap'	/àlaál/	'possum tail'
/sàkám/	'knife (small)'	/sàkaám/	'distant'
/kàlák/	'your cross-cousin	/kàlaák/	'below here'
/ìlám/	'(house) top-plate'	/ìlaám/	'rat sp.'
/ùnáŋ/	'woman'	/ùyaáŋ/	'blame (undeserved)
/àbín/	'umbilical cord'	/àbiín/	'floor', 'bed'
/tìkín/	'roast'	/tìkiín/	'hilltop'

/tìlín/	'hollow (log)'	/tìlíín/	'pre-chewed baby food'
/ìkín/	'tree sp. (for axe handles)'	/ìkiím/	'tree sp.'
/ùlín/	'club'	/kùliín/	'taro sp.'
/kàlúŋ/	'possum sp.'	/kàluúŋ/	'old leaf'
/ìlùb/	'vegetable canes'	/ìluùb/	'tree sp.'
/ìlùm/	'slopes (mountain)'	/ìluùn/	'(water bottle) stopper', 'lid'
/kúlúm/	'a vine (wild yam?)'	/múluúm/	'nose'
/núkùm/	'my friend'	/dúkuùm/	'frog sp.'
/dùlúl/	'wind'	/tùluúl/	'grasshopper sp.'
/nàtnàt/	'Nouhuys' wren-warbler'	/màbmaàt/, /mùbmaàt/	'termite'
/káŋkàŋ/	'small things'	/áŋkaàl/	'wedge', 'lever'
/ùnìn/	'to eat'	/ùùnìn/	'to roar', 'to buzz'
/úbiìl/	'possum sp.'	/úúliìb/	'bird sp.'
/ûnaák/	'baby'	/úùnoók/	'cassowary sp.'
/àloób/	'spherical'	/ààloòb/	'his uncle'
/àlák/	'his cousin'	/àáláb/	'his father'
/álím/	'tree sp.'	/wáálím/	'rat sp.'
/kàtoòb/	'down here'	/kààloòb/	'your father's elder brother'
/tìsoòl/	'grasshopper sp.'	/tììtoòk/	'rat sp.'
/fìnaàm/	'vegetable sp.'	/fììkaàl/	'lips'
/sàmaàl/	'type of shell'	/sààŋaàl/	'snipe sp.'
/nákaàl/	'shoulder'	/dáámaàl/	'marita sp.'
/àálábàl/	'his uncles'	/àálábaàl/	'his paternal grandfather'
/òókénàl/	'his aunts'	/òókénaàl/	'his maternal grandfather'
/ìlìlì/	'blue-cheeked alpine lorikeet'	/màkàyìl/	'type of bow'
/dákáyák/	'truant child'	/ímíyaáb/	'frog sp.'
/úlímàl/	'family'	/kútínaàl/	'possum sp.'
/ìlàmìn/	'to plait rope'	/ìibàmìn/	'to be insufficient'

/sìnàmìn/	'to spend night'	/dììnàmìn/	'to become stuck, caught'
/dákàmìn/	'to pitck (beans)'	/dáákàmìn/	'to plant'
/dùmánú/	'fruited'	/dùùmánú/	'faded'

1.3 FREQUENCY OF CV PATTERNS

In section 1. it was suggested that a word consists of from one to six syllables of the general pattern (C)V(V)(C). However, there is one limitation: the nuclei of medial syllables do not exhibit length contrasts and have all been interpreted as single vowels (V). Thus the general word pattern is

$$(C)V(V)(C)[(C)V(C)]^{n}(C)V(V)(C).$$

Monomorphemic indigenous words have a further limitation in that there is always at least one consonant separating two successive syllable nuclei. Their word pattern is then

$$(C)V(V)(C)[CV(C)]^{n}CV(V)(C).$$

This formula can be further characterized by statistics of 376 monosyllabic, 622 disyllabic, and 158 trisyllabic monomorphemic nouns, adjectives, and verbal adjuncts. CC is not very frequent between consecutive syllables, occurring in about 15% of disyllabic words, about 16% of trisyllabic words between first and second syllable, about 11% of trisyllabic words between second and third syllables. These figures are much less than the 50-70% figure that would be expected if words could be historically pictured as random aggregates of monosyllables. In fact, in compound formation observable in the language today a principle of consonant cluster reduction operates so that about one quarter of the potential CC sequences are reduced to C.

Word-initial vowel (rather than consonant) occurs in 15% of monosyllabic words, 38% of disyllabic words, and 29% of trisyllabic words. Word-final vowel (rather than consonant) occurs in 4% of monosyllabic, 8% of disyllabic, and 6% of trisyllabic nouns, adjectives and verbal adjuncts. However, polymorphemic verbs have a very high percentage (80% say) of final vowels since many verbal suffixes have a final vowel.

Monosyllables behave like word-final syllables as far as the occurrence of VV nuclei is concerned: monosyllables have 67%, final syllables of disyllabic words have 53%, and final syllables of trisyllabic words have 61% of VV nuclei. In

contrast, the initial syllables of disyllabic words have 17% and the initial syllables of trisyllabic words have 19% of VV nuclei.

2. MEASUREMENT OF LENGTH

It was the author's experience that vowel length was particularly difficult to identify in medial syllables. Because of this the author relied heavily on the judgment of his trained informant as to whether a given medial vowel was long or short. The fact that the informant's judgment often fluctuated for medial vowels but was invariant for the vowels of initial and final syllables raised the question as to whether there is a contrast of vowel length in medial syllables. The most consistently contrastive examples (judged by informant reaction) were recorded on magnetic tape so that detailed measurements of length could be made.

2.1 METHODS OF MEASURING LENGTH

As a sound spectrograph was not readily available, two techniques were developed for measuring phonetic segments instead of the rather laborious method of tape-cutting. Both techniques involve the use of a MLR38 Tempo Regulator that has been modified by the manufacturer (Telefonbau und Normalzeit) to give optimal performance at extremes of expansion and compression.

The first technique involves expanding the recorded utterances to exactly double their length by using the MLR38 and recording this expansion on tape running at $3\frac{3}{4}$ inches per second. This tape is audited on an ordinary recorder by threading the tape in a way that by-passes the driving capstan and, with the recorder switched to "playback", by moving the tape manually with a hand on each spool. (See figure 1.) The tape is moved back and forth rapidly over a very short distance (1/8 inch, say), and the phonetic segment at that point on the tape is identified by the characteristic scanning noises produced. It is important to keep the manual oscillation uniformly fast, as a change in the average speed at which the tape passes the play-back head will give a marked change in the timbre of the scanning noises. With practice it becomes possible to distinguish various vowel qualities, nasals, fricatives, stops, and voicelessness by the timbre of their scanning noises. Once this ability has been developed, it is then possible to locate and mark at a suitable place on the tape the transition

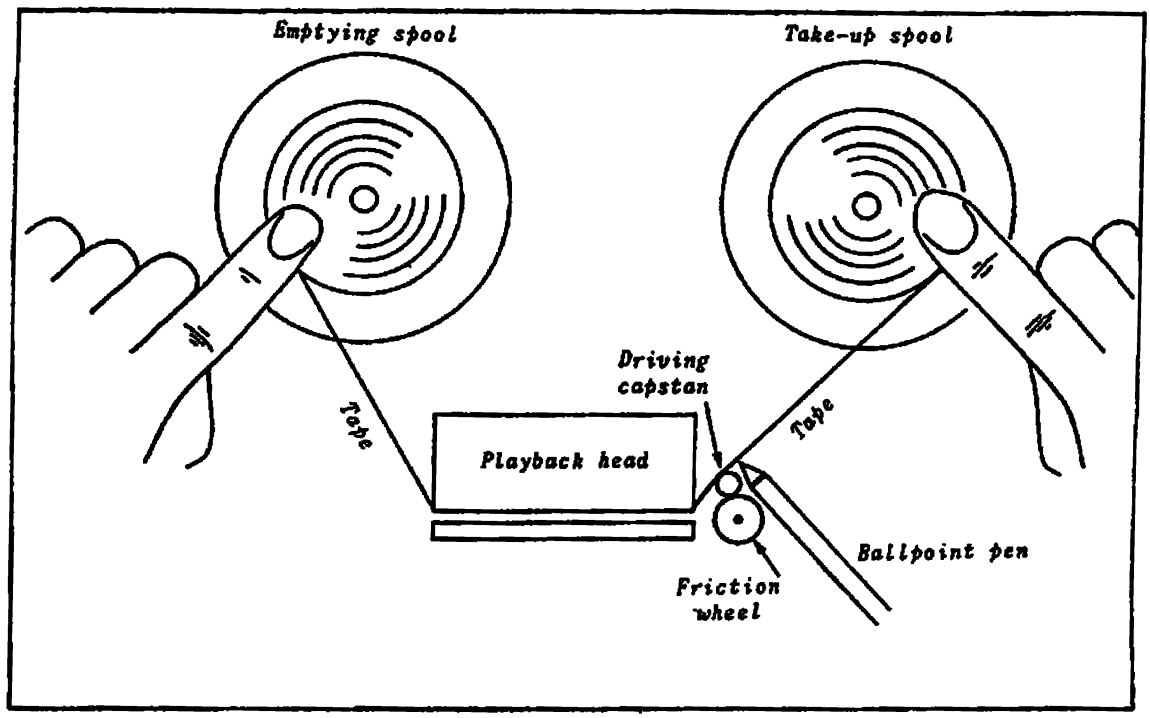

FIGURE 1. MANUAL SCANNING USING A TAPE RECORDER

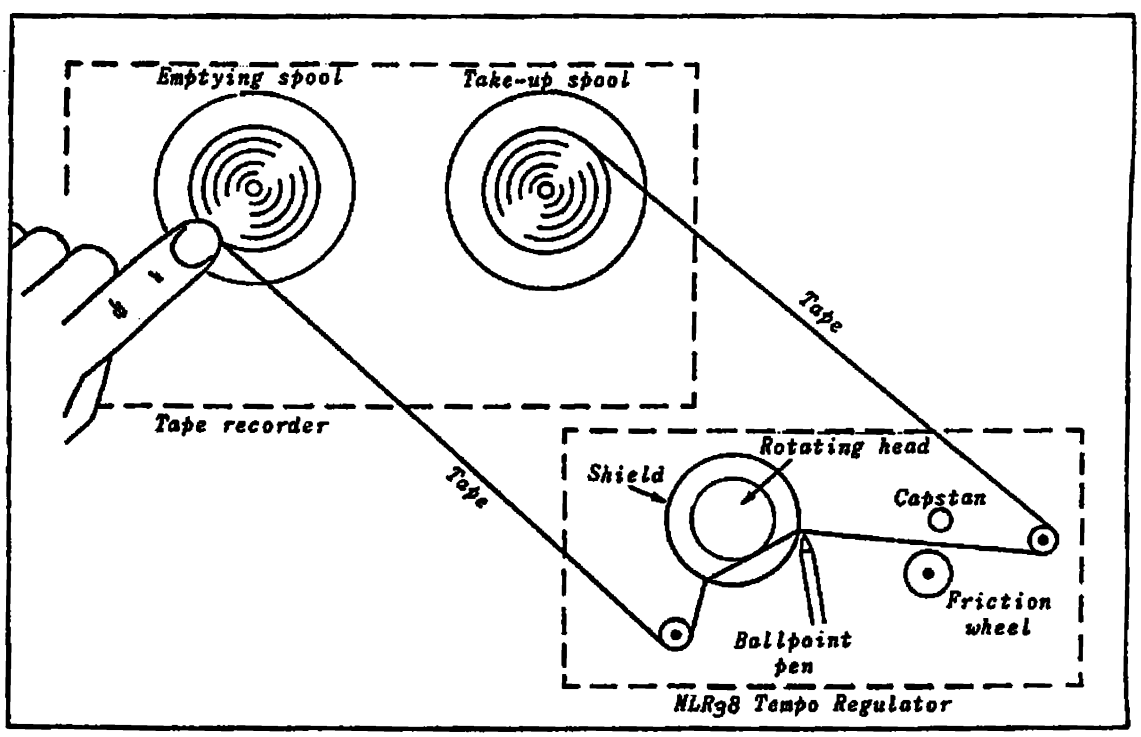

FIGURE 2. MECHANICAL SCANNING USING MLR38 TEMPO REGULATOR

between successive phonetic segments of an utterance. When all such transitions within a given utterance have been marked, the length of each phonetic segment may be directly measured on the marked tape by using a scale with divisions of 0.075 inch, equivalent to 1/100 second each.

If a MLR38 is not available, it is possible to use an unexpanded tape recorded at $7\frac{1}{2}$ inches per second and to scan and measure it in the way described above. However, considerable difficulty is experienced in producing sufficiently fast manual oscillation to give adequate differentiation to the scanning noises of the various types of phonetic segments. An unexpanded tape recorded at $3\frac{3}{4}$ inches per second is better from this point of view, but suffers from the disadvantage of a scale of 0.0375 inches per centisecond, since the accuracy with which phonetic transition points can be located by manual scanning (± 4 centiseconds) is inadequate for the present purpose.

The second technique eliminates the variability involved in manual scanning. The utterances to be studied are copied onto tape at 15 inches per second. This tape is threaded onto a combination of tape recorder plus MLR38 as used for expanding or compressing, with the following deviations from normal procedure:

(a) The tape is threaded round the non-normal side of the revolving head of the MLR38. This is done to reduce the length of tape in contact with the revolving head from 0.6 to 0.1 inches (that is, the head scans less than 1/100 second rather than 4/100 second).

(b) As a consequence of (a), the tape is not given the twist (or lack of twist, depending on the type of recorder) that it usually has when it is threaded round the normal side of the revolving head.

(c) Also as a consequence of (a), it has been found necessary to raise the shield of the revolving head with a small amount of packing to avoid the upper edge of the slits in the shield wrinkling the tape.

(d) The tape is threaded between the driving capstan and friction wheel in the normal way, but the friction wheel is NOT switched into contact with the capstan. In this way, the tape is free to be advanced manually.

(e) The MLR38 is set to the maximum compression (185) and at this setting it scans a stationary tape at about 13 inches per second, which is sufficiently close to the speed at which the tape was recorded.

The emptying spool is held by hand so that when the recorder is switched on only the slack tape is taken up rather than a high-speed forward motion developing. (See figure 2.) The rotating head scans that portion of the stationary tape in contact with it, and the scanning noise produced is characteristic of the particular phonetic segment at that point on the tape. By allowing the tape to unwind very slowly it is possible to locate the transition between successive phonetic segments by the change in timbre of the scanning noise. For each transition a mark is made with a ballpoint pen on the shiny surface of the tape where it emerges from the shield of the rotating head. When all the transitions within an utterance have been marked, segmental lengths may be measured in centiseconds using a scale with divisions of 0.15 inches. Once the tape has been prepared, the process of locating, marking, and measuring phonetic transition points takes an average of only one or two minutes per segment.

2.2 CONTRASTIVE VOWEL LENGTH

Pairs of words with length contrasts in their initial or final syllable were measured, and the results indicate that long vowels (VV) are usually about 50% longer than the corresponding short vowels (V).

In a monosyllable or second syllable of a disyllabic word, when followed by voiced consonants /m/, /n/, /ŋ/, or /l/, a single vowel is about 1 mora long and a geminate vowel about 1½ moras long. When followed by voiceless stops /b/, /k/ or /t/, or when there is no final consonant, a single vowel is about 2 moras long and a geminate vowel about 3 moras. The length of these syllables is almost unaffected by the length of their vowel nuclei as a result of compensatory adjustments to consonant length. Final voiced consonants following a single vowel are about 2 moras long and following a geminate vowel about 1½ moras long, both VC and VVC totalling 3 moras. Thus we may talk of short and long vowels or syllable nuclei, but it is misleading to talk of short and long syllables.

In the final syllable of longer words a geminate vowel is about the same length as in monosyllables (1½ or 3 moras). However a single vowel is somewhat shorter than in monosyllables, being about ½ mora long when followed by a voiced consonant and about 1½ moras long when followed by a voiceless consonant or no consonant.

In initial syllables of polysyllabic words, when preceded by voiced consonants /b/, /d/, /m/, /n/, /w/ or /y/ or when

there is no initial consonant, a single vowel is about ½ mora long, and when preceded by a voiceless consonant /f/, /k/, /s/ or /t/ a single vowel is about ¼ mora long. A geminate vowel in the initial syllable of polysyllabic words is about 1½ moras long. Initial voiced consonants are about 1 mora long and fricatives /f/ and /s/ about 1½ moras long.

All of these statements concerning the relative length of various phonetic segments describe the approximate norms. They fail to show the considerable amount of variation in the relative length of individual segments, especially in initial and final positions. The mora is here defined as the average length of a single vowel when it occurs preceded and followed by voiced consonants in a monosyllable, in the second syllable of a disyllabic word, or in a medial syllable of a longer word. The length of the mora varies with the speed of utterance, but it is assumed that the more and speed remain effectively constant throughout the span of a single word. In the slow speech of the illustrations below the length of the mora ranges between 8 and 13 centiseconds.

The following examples illustrate contrastive vowel length in initial and final syllables. Three or four separate utterances of each word were measured, and the lengths of phonetic segments are given in centiseconds. These repetitions of each word illustrate well the variability in length mentioned above.

All except the last four words were measured by the first technique; the last four words and all those in 2.3 were measured by the second technique. Both techniques are adequately sensitive to demonstrate contrast of vowel length However, the measurement of intervocalic [ɾ] = /l/ was only practicable by the second technique, since this segment is often below the threshold of the first technique (and is consistently represented by 0 in the measurements below).

/d	à	l/	'kidney'	/d	àà	l/	'bamboo sp.'
13	15	18		14	22	13	
13	13	14		12	24	13	
11	11	25		12	31	7	
/b	ù	ŋ/	'splinter'	/b	ùù	ŋ/	'fungus sp.'
13	11	34		13	19	19	
14	9	26		9	20	25	
12	10	21		5	19	18	

/ì	b/	'dust'
19	?	
17	22	
18	7	

/ìì	b/	'centre'
31	4	
28	5	
32	?	
27	13	

/à	l	á	l/	'garden rubbish heap'
10	0	17	13	
11	0	13	21	
9	0	14	20	

/à	l	aá	l/	'possum tail'
11	0	21	18	
11	0	18	11	
10	0	21	11	

/à	b	f	n/	'umbilical cord'
7	5	10	25	
9	5	10	24	
4	5	12	26	

/à	b	íf	n/	'floor'
5	6	13	26	
7	4	19	25	
7	5	15	23	

/k	à	l	ú	ŋ/	'possum sp.'
12	5	0	12	28	
5	7	0	10	29	
7	6	0	9	31	

/k	à	l	uú	ŋ/	'old leaf'
3	5	0	19	28	
13	2	0	20	21	
9	2	0	17	22	

/ì	l	ù	b/	'vegetable canes'
9	0	22	51	
9	0	21	30	
10	0	22	13	
10	0	20	26	

/ì	l	uù	b/	'tree sp.'
8	0	26	3	
6	0	30	52	
8	0	26	6	

/ù	n	ì	n/	'eat'
4	4	17	22	
6	6	5	26	
10	5	12	17	

/ùù	n	ì	n/	'roar'
14	10	10	20	
13	7	8	23	
14	6	8	19	

/s	à	m	aà	l/	'shell sp.'
13	5	5	9	27	
11	5	6	10	20	
20	3	7	15	25	

/s	àà	ŋ	aà	l/	'bird sp.'
13	13	5	13	27	
10	12	10	15	15	
16	15	6	17	11	

/d	á	k	à	m	ì	n/	'pick'
11	6	3	16	9	5	15	
8	2	2	18	9	6	5	
9	5	4	13	9	5	12	

/d	áá	k	à	m	ì	n/	'plant'
12	7	2	21	11	4	15	
12	12	3	14	8	6	11	
12	14	3	12	11	3	15	

/d	ù	m	á	n	ú/	'fruited'	/d	ùù	m	á	n	ú/	'faded'
4	8	13	11	6	19		14	9	10	11	5	17	
13	6	12	9	6	18		10	8	8	10	6	17	
10	4	11	13	5	17		8	9	8	12	5	17	

2.3 NEUTRALIZATION OF LENGTH

In medial syllables there is no contrast of vowel length. All medial vowels have been interpreted as single vowels. These medial single vowels are about one mora long. Some pairs of words that had been believed to contrast in medial vowel length are given below. Intervocalic consonants have been measured as follows: /l/ ¼ mora; /b/ and /k/ ½ mora; /m/, /n/, /t/, /y/ ½ mora after single vowel of first syllable, and 1 mora elsewhere.

"Short" *"Long"*

/b	á	k	á	l	á/	'he followed'	/d	á	k	á	l	á/	'he asked'
11	4	4	11	2	15		11	5	2	14	5	14	
12	4	2	14	1	19		10	6	3	12	2	18	
6	4	2	11	2	18		5	8	4	9	2	15	
3	4	5	8	2	16								

/ì	l	í	k	á	l	á/	'he painted'	/ì	l	í	b	á	l	á/	'he examined'
7	2	8	7	10	2	17		7	4	8	4	14	2	19	
7	1	10	4	11	3	15		9	2	10	6	11	3	17	
9	2	10	4	8	3	16		7	2	10	4	12	1	17	

/ì	l	í	k	m	ì	n/	'to paint'	/ì	l	í	b	m	ì	n/	'to examine'
8	3	9	15	4	5	21		7	3	12	15	6	6	19	
7	3	6	16	7	5	20		6	4	9	17	4	8	12	
4	2	10	14	7	5	17		5	2	12	16	3	4	16	

/d	ù	l	ú	l	á/	'he took them'	/t	ù	b	ú	l	á/	'it adhered'
16	5	2	12	2	20		2	6	4	12	4	17	
7	5	1	12	2	21		3	5	3	15	1	24	
2	4	1	10	1	23		2	8	3	10	0	21	

/k	à	n	ù	m	ì	n/	'to do'	/d	ù	t	ù	m	ì	n/	'to release them'
6	2	2	6	11	6	14		6	9	8	9	8	4	14	
3	3	2	7	11	5	16		10	8	10	7	5	7	13	
4	4	1	5	9	6	17		7	8	7	5	12	3	18	
7	4	2	7	8	5	17									

/f f k f l il l/ 'bean sp.'	/b f l f l il ŋ/ 'bird sp.'
13 6 4 6 1 10 16	12 5 2 8 3 15 16
7 4 5 6 2 11 13	7 6 1 9 2 14 10
9 2 4 6 2 13 10	3 3 2 8 2 15 12

3. CONSONANTS

In this analysis 13 *Teléfól* consonants are described: /b/, /d/, /f/, /k/, /k^{w}/, /l/, /m/, /n/, /ŋ/, /s/, /t/, /w/ and /y/. In addition, the consonants /h/ and /ʔ/ occur only in a few particles such as the exclamatory imperative enclitic /íhíʔ/ or /éhéʔ/, and /g/ and /p/ occur only in a few loan words.

3.1 THE DISTRIBUTION AND TYPICAL ALLOPHONES OF CONSONANTS

are shown in the following tabulation:

Phoneme	/b/	/d/	/f/	/k/	/k^{w}/	/l/	/m/	/n/	/ŋ/	/s/	/t/	/w/	/y/
Syllable-initial allophone	b	d̪	p̪/f	k^{h}	kw	-	m	n̪	-	s̪	t̪^{h}	w	y
Inter-vocalic allophone	b̪/b	d̪	p̪/f	g̪	-	ɾ̪	m	n̪	ŋ	s̪	t̪^{h}	-	y
Syllable-final allophone	p^{h}	-	-	k^{h}	-	l	m	n̪	ŋ	-	t̪^{h}	-	-

The diacritic under [d̪], [n̪], [s̪], and [t̪^{h}] indicates that they are dentals. Bilabial [b̪] and velar [g̪] are voiced fricatives and bilabial [p̪] is a voiceless fricative. Alveolar [ɾ̪] is flapped.

The following word-medial consonant clusters have been observed, those in parentheses being observed only in polymorphemic words, and hyphen indicating sequences which would not be expected because of sandhi rules.

bb	bd	—	bk	bm	bn	bs	bt
kb	(kd)	—	kk	km	kn	ks	-
lb	ld	lf	lk	lm	ln	ls	lt
mb	md	—	—	-	mn	ms	mt
(nb)	nd	—	nk	(nm)	–	ns	nt
(ŋb)	ŋd	(ŋf)	ŋk	ŋm	—	ŋs	–
tb	—	—	tk	tm	tn	—	–

3.2 SOME FURTHER ALLOPHONES

Voiceless stops tend to be only lightly aspirated, and are unaspirated when followed by consonants. /l/ tends to be retroflexed [ɭ] in word-final position following /a/, and fricative [l̟] preceding /t/. Velar consonants tend towards a uvular articulation when contiguous with central and back vowels. Nasals tend to have a slight homorganic voiced stop at their onset when they follow long vowels, e.g. /sùùm/ [g̑u·^{b}m] 'banana'. /k/ is labialized following /uŋ/, but has less [w] off-glide than $/k^w/$. Word-initial /b/ and /d/ sometimes vary to slightly ingressive [b] and [d̑]. Word-initial /f/ sometimes varies to the affricate [pɸ]. The cluster /ld/ sounds more like [ľ] than [ld̑]. /kd/ is the single phonetic segment [g]. /bb/ is [pb]. /kk/ is [k·^{h}]. /ŋd/ is [ŋg].

3.3 FREQUENCY OF CONSONANTS

An examination of the same word sample as described in 1.3 reveals the following list-frequencies of individual consonants, expressed as percentages:

Consonant	/b/	/d/	/f/	/k/	$/k^w/$	/l/	/m/	/n/	/ŋ/	/s/	/t/	/w/	/y/	Total
Word-initial	11	17	9	13	1	-	11	6	-	9	17	2	4	100
Inter-vocalic	9	0.3	5	17	-	29	10	9	3	4	8	-	6	100
Word-final	12	-	-	15	-	19	17	14	14	-	9	-	-	100

Somewhat different figures may be expected for verbs in the intervocalic and word-final positions because of the specific suffixes involved. Thus, intervocalic /b/, /l/, /m/, /n/ and /t/ and final /b/, /m/ and /n/ probably would be rather more frequent in verbs than the figures in the above tabulation indicate for nouns, adjectives, and verbal adjuncts.

4. PROBLEMS IN CONSONANT ANALYSIS

4.1 NEAR-COMPLEMENTATION OF /d/ AND /l/

If the very few occurrences of intervocalic [d̂] could be ignored (and /fòódeék/ 'praying mantis' is the only monomorphemic example observed), then it would be possible to analyze [ř], [l] and [d̂] as complementary allophones of a single phoneme. It appears that this was in fact the historical situation. (A condition favouring the historical development of initial [d̂] and intervocalic/final [ř] ~ [l] into separate phonemes is the lack of opportunity for allomorphic alternation between initial and intervocalic sounds due to the absence of active prefixation in *Teléfól*.)

However, in the present analysis two phonemes /l/ ([ř] ~ [l]) and /d/ were set up even though they contrast only in the intervocalic position. This takes account of the few cases of intervocalic [d̂] and of the additions to their number being made by loan words: /dídímàn/ 'agronomist', /mòòdeèn/ 'mountain', /éédeèn/ 'heathen', /falaedee/^{T} 'Friday', /saladee/^{T} 'Saturday'. (Superscript (^{T}) indicates items for which no tonal information is available.)

4.2 MEDIAL [g]

On the basis of morphological analysis, the few occurrences of medial [g] have been interpreted as allophones of /d/ as follows: intervocalic [g] = /kd/ and [ŋg] = /ŋd/. The only examples of /kd/ are at a morpheme boundary (e.g. /òòk dììm/ [ɔ˙˙·gi·m] 'five' or 'fifth'), but several examples of /ŋd/ are monomorphemic (e.g. /níŋdíl/ 'few'). When [g] occurs at a morpheme boundary the separate morphemes exhibit

[k] and [d] or [ŋ] and [d] in other contexts. Loans have brought in almost no examples of medial [g], but a few of word-initial [g]: [got] /gòòt/ 'God', /gítà/, /kítà/ 'guitar'. For the present, this may be analyzed as an extra-systematic phoneme /g/ Should initial /g/ become well established through many loan words, the medial occurrence of [g] could be re-interpreted as /g/ rather than /d/, that is, [g] = /g/ or /kg/, [ŋg] = /ŋg/. This would increase morphophonemic complexity somewhat, but in conformity with an existing pattern: after velars /t/ > /k/ and /d/ > /g/.

In 1957 Rev. G.J. McArthur of the Australian Baptist Missionary Society made a tentative phonemic analysis of *Teléfól* in which the intervocalic contrast of [g] and [k·^{h}] was regarded as a contrast of /g/ and /k/. Medial [g] was analyzed as /g/ and initial and final [k^{h}] as /k/. However, this analysis results in very extensive morphemic alternation at the morphophonemic level, since word-final [k^{h}] regularly becomes intervocalic [g] upon suffixation. The present analysis keeps this morphemic alternation at the allophonic level by regarding intervocalic [g] as an allophone of /k/; and the contrast with intervocalic [k·^{h}] is maintained by regarding the latter as /kk/ This treatment of intervocalic [k·^{h}] is also supported by a morphemic analysis of some of its occurrences, e.g. /súùkkoón/ 'paper' from /súùk/ 'tobacco' and /kòón/ 'leaf', 'wrapper'.

Should syllable-initial /g/ become well established through loan words, there would seem to be no advantage in attempting to link intervocalic [g] with it as an allophone.

4.3 NEUTRALIZATION OF /b/ AND /w/

In intervocalic position /b/ and /w/ do not contrast Following /i/, /e/, and /a/ only [b] occurs, and following /o/ and /u/ lenis [b] and [w] occur in free variation. All intervocalic occurrences of both [b] and [w] are here regarded as allophones of /b/. Firstly, this results in a simple distribution of consonants, with /w/ only in initial position, and /b/ in initial, final, and all intervocalic positions, irrespective of the preceding vowel. Secondly, this avoids morphophonemic variants when a noun stem with final /ob/ or /ub/ is suffixed (e.g. /sòòb/, /sòóbím/

'possum') or when a verb stem ending in /o/ or /u/ is suffixed for the near past or present continuous tenses (e.g. /bɔ́kɔ̀ɔ̀/ 'say', /bɔ́kɔ̀bá/ 'he said').

If intervocalic [ɓ] after /i/, /e/ and /a/ is regarded as /b/, and freely varying [ɓ]/[w] after /o/ and /u/ are both interpreted as /w/ as was done by McArthur (and this practice is followed by many literates in their writing), then a consonant distribution results which is unparalleled by other consonants: /w/ in initial position and intervocalic position after /u/ or /o/, and /b/ in initial and final positions and intervocalic position after /i/, /e/ or /a/. Also allomorphic alternation between /b/ and /w/ is introduced, e.g. /sɔ̀ɔ̀b/, */sɔ̀ɔ́wím/ 'possum'; /báká/ 'follow', /bákábá/ 'he followed', /bɔ́kɔ̀ɔ̀/ 'say', */bɔ́kɔ̀wá/ 'he said'.

A third analysis, with most of the advantages of the one adopted here, would regard all occurrences of intervocalic [b] as /b/ and all occurrences of [w] as /w/. Thus /b/ would occur in all intervocalic positions, but /w/ would only occur in free variation with /b/ following /o/ and /u/.

Following /u/ the situation is somewhat more complicated. Although /k/ and /b/ contrast in this environment as elsewhere (e.g. /úbál/ 'bird sp.', /úkál/ 'she herself'), the phonetic difference is often quite difficult to hear since the /k/ tends to be a lip-rounded fricative [ɸ] in this context. In addition, some words containing the sequence /uba/ in the speech of my second informant contain /uka/ in the speech of my first informant, e.g. /sùbàyoɔ̀k/, /sùkàyoɔ̀k/ 'long ago', and this leads to confusion unless only one informant is used.

4.4 INTERVOCALIC /y/ AND /w/

The occurrence of /y/ and /w/ in intervocalic positions is uncertain. As mentioned above in 4.3, intervocalic /w/ does not follow /a/, /e/ or /i/ and it has been assumed on grounds of simplicity that it does not follow /o/ or /u/ either. On the other hand, /b/ clearly does occur following /a/, /e/ and /i/ and it has been assumed that it also follows /o/ and /u/. When one comes to interpret a sequence such as [uʔa], */uwa/ has been ruled out and /uba/ has been suggested as the acceptable interpretation. But a third possibility, */uua/ or */ua/, needs to be considered also. However, there are no non-suspect sequences of unlike vowels in *Teléfól* except at morpheme boundaries. Thus, in the absence of a morpheme boundary, there is no satisfactory analogy for an interpretation such as */uua/ or */ua/.

Turning now to /y/, it may be noted that there are clear intervocalic occurrences such as /ùyaáŋ/ 'undeserved blame', /káyaàm/ 'dog'. When it comes to the interpretation of sequences such as [i·a], in the absence of a morpheme boundary /iya/ is the only reasonable interpretation because of the lack of non-suspect monomorphemic unlike vowel sequences as a basis for positing */iia/ or */ia/.

4.5 LOANS WITH /p/

A few loan words from Neo-Melanesian contain initial and intervocalic lightly aspirated /p/ and this is often an idiolectal variant with /b/: /fàpuà/ 'Papua(n)', /kààpà/, /kààbà/ 'corrugated or sheet iron', /pîkìm/, /bîkìm/ 'a pick'. Intervocalic /p/ seems to be in contrast with intervocalic /bb/ [pb], as in /bàábbaà/ 'insect bite'. Several more occurrences of /p/ without variation to /b/ would be needed to regard /p/ as established in *Teléfól*.

4.6 LOANS WITH FINAL /s/

Teléfól indigenous words do not have final /s/. However, many *Teléfól* speakers are familiar with neighbouring cognate languages that do have final /s/. Also, *Teléfól* words with final /t/ have allomorphs with /s/ instead when followed by a vowel in derived forms, e.g. /úleèt/, /úleèsím/ 'possum sp.' Consequently, loan words with final /s/ have been readily accepted into *Teléfól* and before long it will probably be possible to say that final /s/ has been established in contrast with final /t/, though some free variation occurs at present. /kálaàs/ 'mirror', /wáàs/, /wáàt/ 'pastor', /díliìs/, /díliìt/ 'beef dripping', /bóólìs/ 'policeman', /kálábuùs/,/kálábuùt/ 'gaol', /óóbìs/ 'office', /ílaès/, /ílaèt/ 'rice', /kàábiìs/ 'spinach', /másiìs/ 'matches', /fíìs/ 'tinned fish', /tóòt/, /tóòs/ 'torch, flashlight', /kúùs/, /kùs/ 'cough, cold', /búùs/ 'forest', /yèèsùs/ 'Jesus'.

4.7 COMPLEMENTATION OF /k^w/ AND /ŋ/

Although [kw] and [ŋ] are in complementary distribution (see 3.1), they have been analyzed as two separate phonemes /k^w/ and /ŋ/ rather than as allophones of a single phoneme because (a) these two items do not occur in allomorphic alternation, and (b) there is no precedent in neighbouring cognate languages for treating [kw] and [ŋ] as allophones.

5. VOWELS

In this analysis 5 *Teléfól* vowels are described: /a/,

/e/, /i/, /o/ and /u/. Long vowels have been tentatively analyzed as geminates VV.

5.1 THE DISTRIBUTION OF THE VOWELS

In monosyllables: all vowels occur geminate and /a/, /i/ and /u/ occur singly; all of these single and geminate vowels occur followed by any of the syllable-final consonants and lack of consonant; these vowels also occur preceded by any of the syllable-initial consonants and lack of consonant, except that the following sequences do not occur: /k^woo/, /k^wu/, /k^wuu/, /woo/, /wu/, /wuu/. This limitation also holds in syllables of longer words. In monosyllabic nouns the sequences /ki/, /kwa/, /wa/, /yi/ and /yii/ have not been observed either, but they do occur very rarely in longer words.

In poly-syllabic words there are some limitations in the interrelationship of the vowels of the various syllables, and these will receive detailed discussion below in section 6.

Although VV nuclei are always geminate vowels in indigenous words, unlike sequences or diphthongs seem to be appearing in some loan words. Sometimes it is difficult to decide whether a particular vowel sequence is a single nucleus or whether it is disyllabic. The following list of loan words containing a diphthong in the source language demonstrates that some retain the diphthong in *Teléfól* while others replace it by a long vowel.

Teléfól	SOURCE	MEANING
/wáálìt/	NM wailis	radio
/báàlàt/	AE páylət	Pilate
/ílàsìyà/	AE iyláyjə	Elijah
/aasaya/[T]	AE ayzáyə	Isaiah
/éédeèn/	NM haiden	heathen
/fáèb/	NM paip	pipe (smoking)
/fàèl/	NM fail	file
/náèb/	NM naip	knife
/ílaès/	NM rais	rice
/ìlaèn/	NM lain	group, clan
/falaedee/[T]	NM fraide	Friday

Teléfól	SOURCE		MEANING
/móótú báèk/	AE	máwtebayk	motor bike
/baebeel/[T]	NM	baibel	Bible
/áásìk/, /úsìk/	NM	haus sik	hospital
/áásúkùl/, /úsúkùl/	NM	haus skul	school
/ááskuùk/	NM	haus kuk	kitchen
/tààbálàseéb/	PM	tau bada	European
/sítoòn/	NM	sindaun	sit
/mòòdeèn/	NM	maunten	mountain
/áútálàlìyà/	NM	australia	Australia
/bóólboòl kèèmìn/	NM	boil	to boil
/bóè/	NM	boi	employee

AE Australian English, NM Neo-Melanesian, PM ·Police Motu

The ready acceptance of /ae/ in loan words is probably due to the high frequency of occurrence of bimorphemic /aa#ee/ in *Teléfól* benefactive verbs.

5.2 TYPICAL VOWEL ALLOPHONES

In monosyllables and the final syllables of polysyllabic words the vowels have the following typical phonetic values:

/a/	/aa/	/ee/	/i/	/ii/	/oo/	/u/	/uu/
[ʌ˞/a]	[a·]	[ɛ·]	[ɪ/i]	[i·]	[ɔ·]	[ʊ/u˞]	[u˞·]

Some speakers make a slight distinction in the vocoid quality of single and geminate vowels fairly consistently, whereas other speakers make no such distinction. When contiguous with /s/ or /y/ the vowels /u/ and /uu/ tend to be centralized almost as far as [ʉ] [ʉ] and [ʉ·] respectively.

The values of the phonetic symbols used for the vowels are as follows:

	UNROUNDED	*ROUNDED*
	FRONT - - - - - CENTRAL	*CENTRAL - - - - - - BACK*
HIGH	i	ɯ u"
	ɪ	ʊ ʊ
MID	ɵ	
	ɛ ʌ	
LOW	ʌ˞	ɔ
	ɑ	

5.3 FREQUENCY OF VOWELS

An examination of the same body of data as in section 1.3 reveals the following list-frequencies for vowels, as percentages:

	Mono-syllables	*Disyllabic Words*		*Trisyllabic Words*			*Average*
		1st syll.	*2nd syll.*	*1st syll.*	*2nd syll.*	*3rd syll.*	
/a/	13	23	21	30	36	16	22
/aa/	10	7	15	5	-	9	9
/ee/	17	2	7	3	-	9	7
/e/	-	5	-	1	7	-	1
/i/	10	26	14	25	26	17	19
/ii/	11	6	8	3	-	10	7
/oo/	18	6	15	3	-	24	12
/o/	-	5	-	3	12	-	3
/u/	9	16	12	22	19	7	13
/uu/	12	6	8	5	-	8	7
Total	100	100	100	100	100	100	100

In the polysyllabic words, for each vowel quality there is a clear trend for geminate vowels to predominate in the final syllable and single vowels to predominate in the initial syllable. This confirms the CV pattern trend mentioned in 1.3.

6. VOWEL NEUTRALIZATION

In non-final syllables of polysyllabic words, and especially in initial syllables, there appears to be a certain amount of neutralization of the contrasts between single vowels.

6.1 WORDS WITH INITIAL VOWEL

The initial syllable of words with initial vowel, though short, is easy to hear and there is good evidence for contrast. The phonetic quality of these initial vowels is /a/ = [ʌ], /i/ = [ɪ], /u/ = [ʊ].

/álím/	'tree sp.'	/ílím/	'tinea; cloth'	/úlím/	'father-and-child'
/ánáŋ/	'place'	/ínám/	'tree sp.'	/únám/	'grass skirt'
/ákít/	'drying rack'	/íkít/	'male animal'	/úkíl/	'bird sp.'
/àfáb/	'rear of house'	/ìfák/	'perspiration'	/ùfáb/	'bird sp.'
/àbaál/	'tasty'	/ìbaál/	'barbecued'	/ùbaál/	'tree sp.'
/àmiít/	'brown pine'	/ìmiín/	'hors d'oeuvre'	/ùmiín/	'elephant beetle'
/àleém/	'bird sp.'	/ìleén/	'edge of forest'	/ùleèm/	'timid'
/áloòb/	'two'	/íloòb/	'green blowfly'	/úloòl/	'inner face of dam'
/álú/	'marita sp.'	/ílúm/	'foetal sac'	/úlúk/	'sugar cane sp.'

6.2 WORDS WITH INITIAL CONSONANT

However, in words with an initial consonant the linguist's difficulties begin. In addition to the general shortness of the vowels of initial syllables, they are extremely short or even missing altogether when followed by intervocalic /l/, and especially when the word-initial consonant is /b/, /d/,

/f/, /k/ or /t/. The first syllable vowel is almost as short, though never missing, when followed by an intervocalic /k/. (These auditory impressions of shortness have not yet been checked by measurement.) Also, the vowel of the first syllable is partially devoiced following initial /k/ and /t/. Furthermore, many short initial syllables contain a puzzling central vocoid [ə] that does not occur in final syllables.

Under these circumstances the author found vowels rather difficult to identify, so made a special investigation of 312 disyllabic monomorphemic words with the general pattern CVCV(V)(C) to determine whether or not the three-way contrast of single vowels is maintained following an initial consonant. The results indicate that following an initial consonant there is a partial neutralization of vowel distinctions, and that only two-way vowel contrasts occur.

(a) Following initial /k/ single /i/ does not occur. However, /a/ and /u/ both occur (26 and 21 occurrences respectively) and are in clear contrast. In this context /a/ has free variant allophones [ʌ˞], [ʌ] and [ə], and /u/ is [u].

/káleèl/	'possum nest in limestone sink-hole'	/kúleèl/	'landslide'
/kámán/	'snake sp.'	/kúmák/	'ginger (plant)'
/kàtíb/	'small'	/kùtím/	'morning'
/kàlutín/	'widow'	/kùlutík/	'frog sp.'
/kàliím/	'moon, month'	/kùliín/	'taro sp.'

(b) Following initial /b/, /d/, /f/, /m/, /n/, /s/ and /t/ and preceding intervocalic /n/, /s/, /t/ and /y/ 55 occurrences of /i/ have been observed, as well as 11 occurrences of /i/ freely varying with /a/ (and with /u/ too, in two cases), and just one occurrence of invariant /a/. This latter may be regarded as the sole instance of vowel contrast in this context. In this context /i/ is [ɪ] and /a/ is [ə]/[ʌ].

/mánúl/	'long net hat'	/bìnúŋ/	'parasitic growth on tree'

(c) Following initial /b/, /d/, /f/, /m/, /n/, /s/, /t/ and /y/ and preceding intervocalic /b/, /f/, /k/, /l/, /m/ and /ŋ/ 177 words have been observed in which the single vowel of the first syllable is identical to the vowel(s) of

the second syllable. Such a homophonous vowel, whether it be /a/, /i/, or /u/, has [ə] as a free variant allophone, and even [ʌ] has occasionally been recorded as a free variant. In addition 14 words have been observed in which there is free variation between a homophonous vowel and /u/, and 7 words in which invariant /u/ occurs. These latter may be regarded as the only instances of vowel contrast in this context. In homophonous contexts /i/ is [ɪ]/[ə], /a/ is [ʌ]/[ə], /u/ is [ʊ]/[ə]; non-homophonous /u/ is [u].

/dàlán/	'tree sp.'	/dùlaán/	'frog sp.'
/yákaàl/	'adze'	/yúkaàm/	'banana sp.'
/sàkaán/	'distant'	/sùkaán/	'frog sp.'
/sàŋaáŋ/	'fern or grass sp.'	/tùŋaál/	'dancing chest straps'
/bèleél/	'biting fly'	/dùleél/	'small dancing shells'
/nèleèn/	'bird sp.'	/dùleèb/	'lizard sp.'
/tímít/	'cucumber'	/dùmít/	'small reeds with yellow flower'

An examination of 51 monomorphemic disyllabic nouns, adjectives and verbal adjuncts of the general type CVCCV(V)(C) shows approximately the same features of frequency, free variation and contrast described above for words with a single intervocalic consonant. A few contrastive examples catalogued as above are:

(a)	/kàbkeét/	'bachelor'	/kùbmì/	'frog sp.'
(b)	/nàtnàt/	'bird sp.'	/nítnaàt/	'ventilators'
(c)	/bàŋkáb/	'swelling'	/túŋkák/	'yawn'

However, two cases of contrast do not fit in with the observations for category (c) of the words with a single intervocalic consonant where /i/ does not precede a syllable containing /a/:

/sìŋsaáŋ/, /sàŋsaáŋ/	'leafless'	/sùŋdaàm/	'ash on skin'
/fìlnaàŋ/	'bird's head feathers'	/bàlbàl/	'type of insect'

An examination of polymorphemic disyllabic words of all word classes of the general type CVCV(V)(C) reveals the following situation:

(a) Following initial /k/, /u/ and /a/ occur in clear contrast. The only occurrence of /i/ is the phrase modifier

/kìmín/.

/káboó/	'you (masc.)'	/kúboó/	'you (fem.)'
/kàlíb íyoó/	'these'	/kùlíb íyoó/	'those'
/kàlaák/	'down here'	/kùlaák/	'down there'
/kàtoòb/	'down here'	/kùtoòb/	'down there'
/kàmeèt/	'up here'	/kùmeèt/	'up there'
/káfúmìn/	'to lift you'	/kúfúmìn/	'to lift her'
/kámòmìn/	'to look after you'	/kúmòmìn/	'to look after her'

(b) (c) Single vowels following initial consonants other than /k/ seem not to be limited in their occurrence, although the evidence for a three-way contrast is rather fragmentary.

		/níté/	'I'	/nútá/	'we'
		/nìsoó/	'with me'	/nùsoó/	'with us'
/sànánú/	'seedy'	/wínànú/	'has a yolk'		
/dàmánú/	'matured'			/dùmánú/	'fruited'
/dákàmìn/	'pick beans'			/dúkàmìn/	'take her'
/tábànú/	'padded'	/tíbànú/	'brown'	/fùbánú/	'tassled'
/fálémá/	'he is fasting'	/fìlánú/	'has humus'	/dùlánú/	'scarred'

It is noteworthy that monomorphemic words with a single intervocalic consonant exhibit the highest degree of vowel neutralization, monomorphemic words with intervocalic consonant clusters exhibit slightly less vowel neutralization, and bimorphemic words with a single intervocalic consonant the least degree of neutralization. It seems likely that a historical explanation of this gradation is possible.

6.3 VOWEL ALLOPHONES

In initial syllables there is no contrast between /u/ and /o/ or between /i/ and /e/. (However /uu/, /oo/, /ii/, and /ee/ all occur and contrast in initial syllables.) Since single /e/ and /o/ do not occur in monosyllables and final syllables, it would be possible to interpret any occurrence of [ɛ] or [ɔ] in initial syllables as allophones of /i/ or /u/. However, in the present analysis, the occurrences of [ɛ] and [ɔ] have been interpreted as occurrences of /e/ and

/o/. Though the details of the non-contrastive distribution of /e/ and /i/ and of /o/ and /u/ require further field checking, it seems that /e/ and /o/ occur in initial syllables following an initial consonant when the following syllable contains /ee/ and /oo/ respectively, and that /i/ and /u/ occur in all other contexts. Neither single /i/ nor /e/ are observed following initial /k/.

In this analysis [ə] in initial syllables has been allotted to /a/ if the initial consonant is /k/. For other initial consonants [ə] in the initial syllable has been allotted to /a/ preceding intervocalic /n/, /s/, /t/ and /y/; and preceding intervocalic /b/, /f/, /k/, /l/, /m/ and /ŋ/, [ə] in the initial syllable has been allotted to whichever of the five vowel phonemes occurs in the second syllable. Alternatively, it would be possible to set up a sixth vowel phoneme */ə/. However, such a phoneme would never occur as an invariant but always in free variation with some other vowel phoneme, and would never participate in more than a three-way vowel contrast.

"Missing" vowels have invariably been interpreted as being identical to the vowel of the next syllable. First syllable vowels that are not homophonous with the second syllable may be very short before /l/ but never completely disappear. The toneme belonging to a devoiced or missing vowel may be inferred from the phonetic pitch of the following syllable. That is, the particular allophone of the toneme of the following syllable is partly determined by the toneme of the hard-to-hear syllable. In fact, this conditioning provides direct evidence of the reality of the "missing" vowel preceding intervocalic /l/. For instance, it is observed that problematic [pl̆ʌ˥pʰ] 'flea' has a pitch pattern similar to both monosyllabic /fàb/ [pʌ˥pʰ] 'grass sp.' and disyllabic /naka/ [nʌgʌ˥] 'outsider', and that problematic [bl̆ūl] 'borer' has a pitch pattern similar to both monosyllabic /búl/ [būl] 'point' and disyllabic /búbúl/ [bubūl] 'heart'. However, problematic [dl̆ʌ˥n] 'tree sp.' has no monosyllabic analogue, but it does have a disyllabic analogue in /dàkán/ [dʌgʌ˥n] 'thin cane sp.'. Monosyllabic nouns, adjectives, and verbal adjuncts exhibit two common contrastive pitch patterns and disyllabic ones three. Words with initial contoid sequences [bl̆], [dl̆], [pl̆], [kl̆] or [tl̆] exhibit the same three common pitch patterns as disyl-

labic words, and these contoid sequences have been analyzed as syllables containing a "missing" homophonous vowel carrying a toneme, rather than as a consonant cluster.

K.L. Pike has suggested to the author that the neutralization of vowel contrasts in initial syllables is a direct historical consequence of the general word dynamics with its ultra-short initial vowels.

6.4 VOWEL HARMONY

As a consequence of the analysis adopted in 6.3, five morphemes within verbs exhibit vowel harmony with the vowel of the following syllable - usually a subject-person suffix.[4] They are:

the verb stem /tál/ ~ /túl/ ~ /tòl/ ~ /tíl/ 'come'

the continuative aspect suffix variants /-nkál/ ~ /-nkúl/ ~ /-n#kòl/,

the homopersonal dependent suffix /-nàl/ ~ /-nùl/ ~ /-nìl/,

the heteropersonal dependent marker /#sàl/ ~ /#sùl/ ~ /#sìl/,

the heteropersonal dependent marker /#kàl/ ~ /#kùl/.[5]

It is the chief merit of the alternative analysis involving */ə/ that these five morphemes would have no vowel harmony allomorphs.

7. TONEMES

The analysis adopted in this paper involves two tonemes, an UP toneme marked with an acute accent, and a DOWN toneme marked with a grave accent. The behaviour of these phonemes is best illustrated by first considering words that contain only single vowels, that is, words containing no geminate vowels.

7.1 DISTRIBUTION OF TONEMES

Each short syllable-nucleus carries or contains one toneme, except for a few contracted syllables which carry two tonemes. Within each syllable there seems to be no correlation or co-occurrence limitation between the toneme and the consonants and vowels. Between the tonemes of syllables within a word there are no limitations of co-occurrence. However, if one restricts the enquiry to single morphemes some trends may be noticed. For instance, of monomorphemic

disyllabic nouns, adjectives and verbal adjuncts, 48% are DOWN-UP, 43% are UP-UP, only 8% are DOWN-DOWN, and just 1% are UP-DOWN. Of monomorphemic verb stems 77% are UP-UP, 16% are DOWN-UP, only 6% are DOWN-DOWN, and none are UP-DOWN. Nevertheless, taking words as a whole, two monosyllabic, four disyllabic and eight trisyllabic contrastive tonal patterns have been observed. Not all of the expected sixteen four-syllable patterns have been observed, partly because such long simple nouns are rare, and compounds involve tonal sandhi which reduces the number of patterns possible for them, and partly because polysyllabic verbal suffixes do not include all of the tonal possibilities. The best contrastive examples of all the one, two, and three syllable tonal patterns are listed below.

/bíl/	'wild banana sp.'	/dál/	'shallow water'
/bìl/	'payment feast'	/dàl/	'kidney'
/dúb/	'wild cane sp.'	/dám/	'white clay'
/dùb/	'tree sp.'	/dàm/	'body'
/kúl/	'hand'	/ún/	'arrow'
/kùl/	'frog sp.'	/ũŋ/	'thigh'
/búk/	'tree sp.'	/tít/	'bridge support'
/bùk/	'pig's foraging'	/tìt/	'splinters (on dry wood)'
/tín/	'native bee'	/bán/	'palm'
/tìm/	'head louse'	/bàn/	'ceremony'
/dìnìn/	'to build'	/bàlbàl/	'friendly'
/dìlím/	'mistletoe sp.'	/bànbán/	'shame'
/dúlìn/	'taken'	/káŋkàŋ/	'small things'
/dílím/	'rat's teeth marks'	/bímbín/	'frog sp.'
/kàfùŋ/	'walking stick'	/ìlì/	'snake sp.'
/àkúm/	'gourd water-bottle'	/ùlín/	'club (weapon)'
/núkùm/	'my friend'	/úlìn/	'planted'
/ákúm/	'wild banana sp.'	/úlín/	'Plant it!'
/nàkàl/	'I myself'	/ìlàŋ/	'dark-stained water'
/màkál/	'hindquarters'	/ìlám/	'house top-plate'
/mákál/	'wild cane sp.'	/ílám/	'dream'
/tìkìnìn/	'to persist'	/kànùmìn/	'to do'
/fìkìlíl/	'tree sp.'	/ìmìlím/	'tinea'

/dìmíníl/	'parrot sp.'	/nàmáyím/	'white cockatoo'
/ìlúlìn/	'vessel containing water'	/ìmákìm/	'husband'
/núkùmàl/	'my friends'	/ímdàlìm/	'his half-sibling'
/dísànú/	'it cooled'	/yámànú/	'it ripened'
/fíkínìm/	'banana sp.'	/kábúmìn/	'to roast'
/dílíbín/	'pig pox'	/kábúmín/	'Roast it!'

7.2 PHONETIC DETAILS OF TONEMES

The actual shapes of the pitch contours of words seem to be unaffected by the particular consonants and vowels they contain. However, they *are* affected by the tonal context in which the word occurs, as may be seen in Tables I, II, and III, as well as by the specific sequence of tonemes contained in the word itself. In the context formulae /./ represents a final intoneme with or without a pause.[6] The sandhi-free tonal contexts are represented as monosyllabic words, and their pitches are shown with dotted contours. The five guide lines represent high, upper-mid, mid, lower-mid, and low pitch respectively, reading from top to bottom. The phonetic accuracy of these pitch contours cannot be vouched for. They are based solely on the author's impressions. However, the contrasts between them have been thoroughly checked.

7.3 STRESS

The author has not been able to detect any consistent and marked differences in loudness between the syllables of a word. On various occasions "stress" has been noted, but later checking has shown that such observations were in fact falling pitches, high pitches, or phonetically long vowels, all of which are features associated with Australian English "stressed" syllables.

7.4 TONEMES OF LONG SYLLABLE-NUCLEI

Although words containing geminate vowels may be analyzed in terms of the same two UP and DOWN tonemes as words containing only single vowels, there are some differences of toneme distribution.

Words whose first syllable-nucleus is short but whose final syllable-nucleus is long, exhibit pitch contours identical in number and phonetic detail to those for words containing only short syllable-nuclei. It has been concluded from this that these words have the same possibilities for

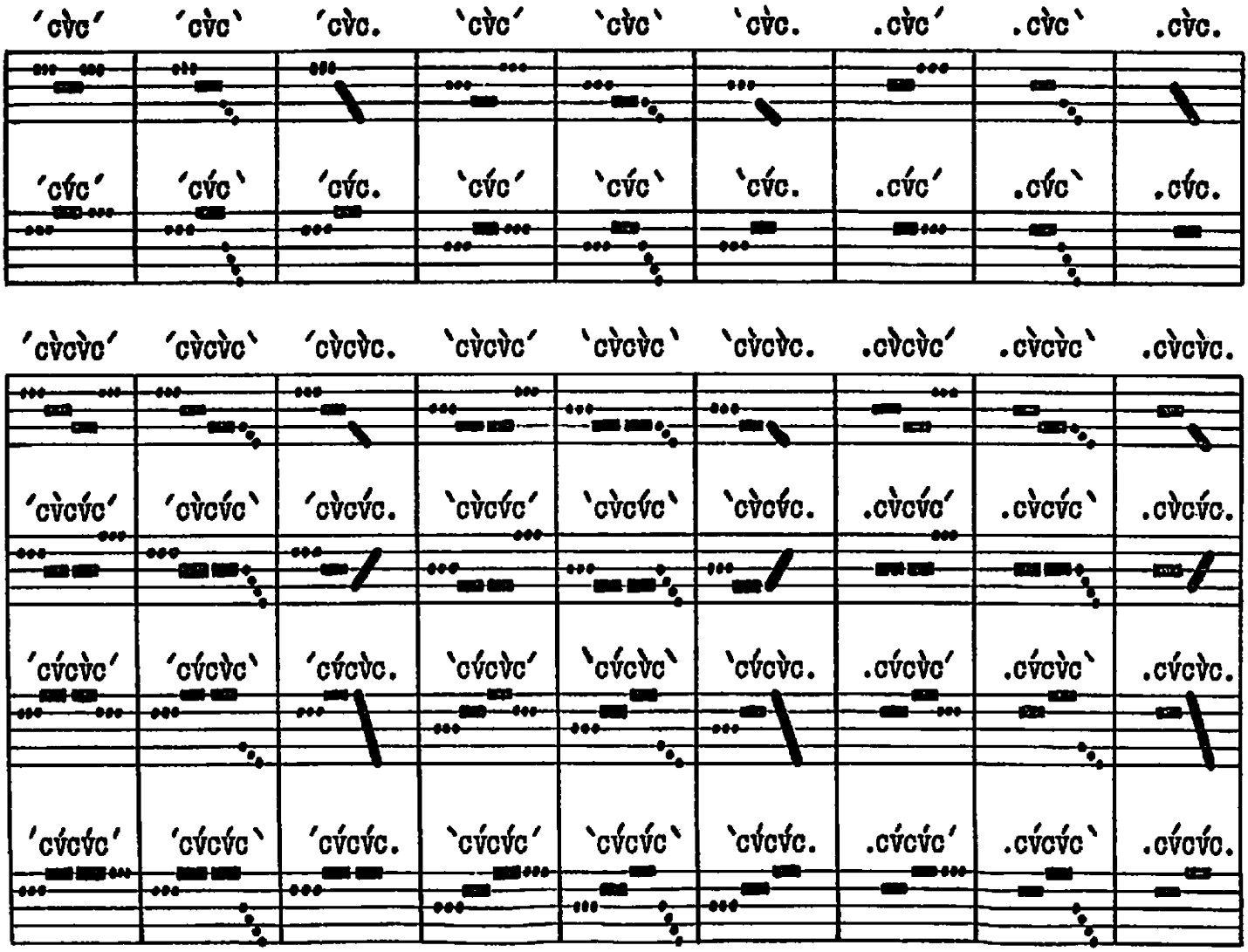

TABLE I. PITCH CONTOURS OF WORDS WITH ONE AND TWO SHORT SYLLABLE-NUCLEI

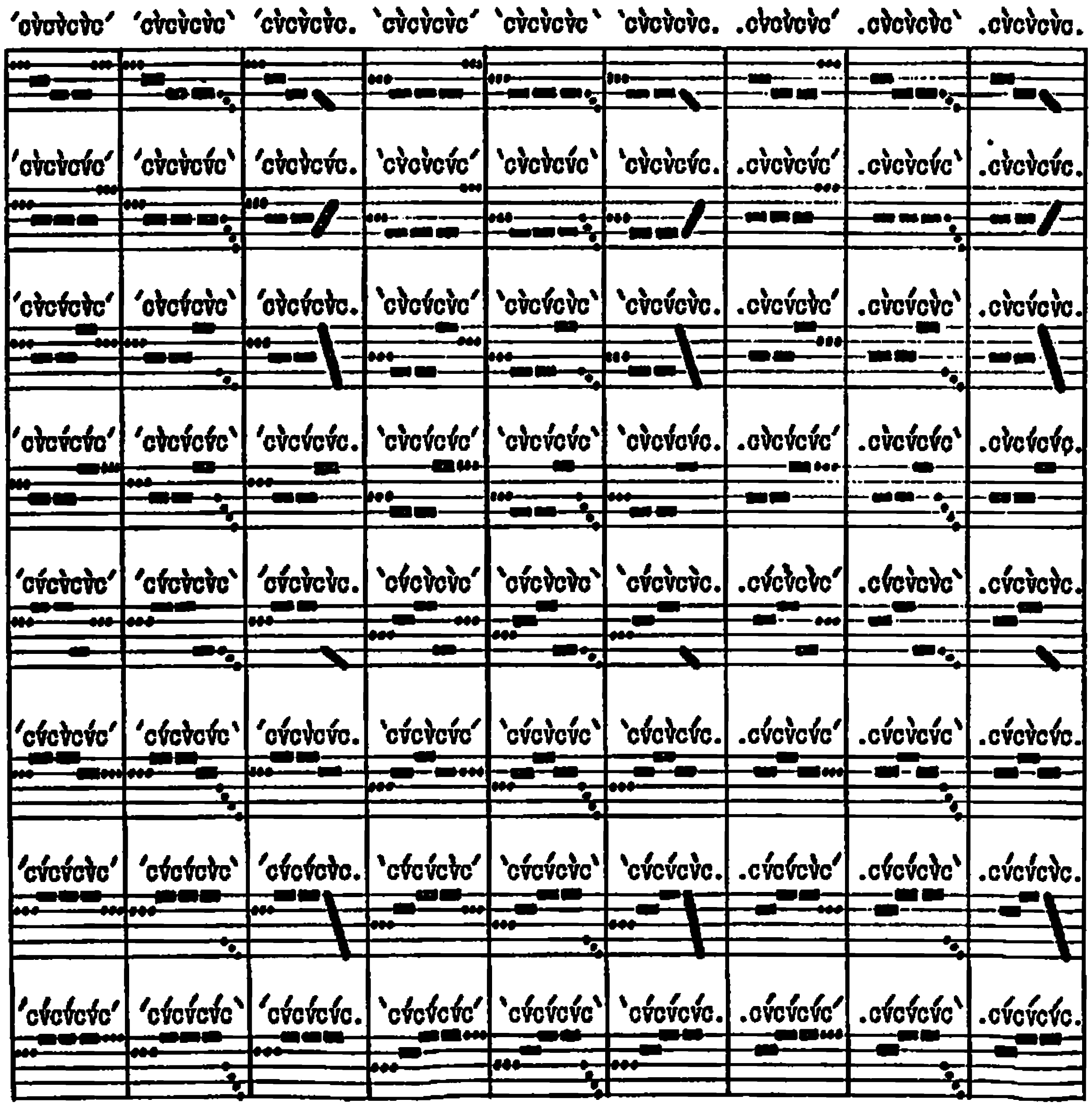

TABLE II. PITCH CONTOURS OF WORDS WITH THREE SHORT SYLLABLE-NUCLEI

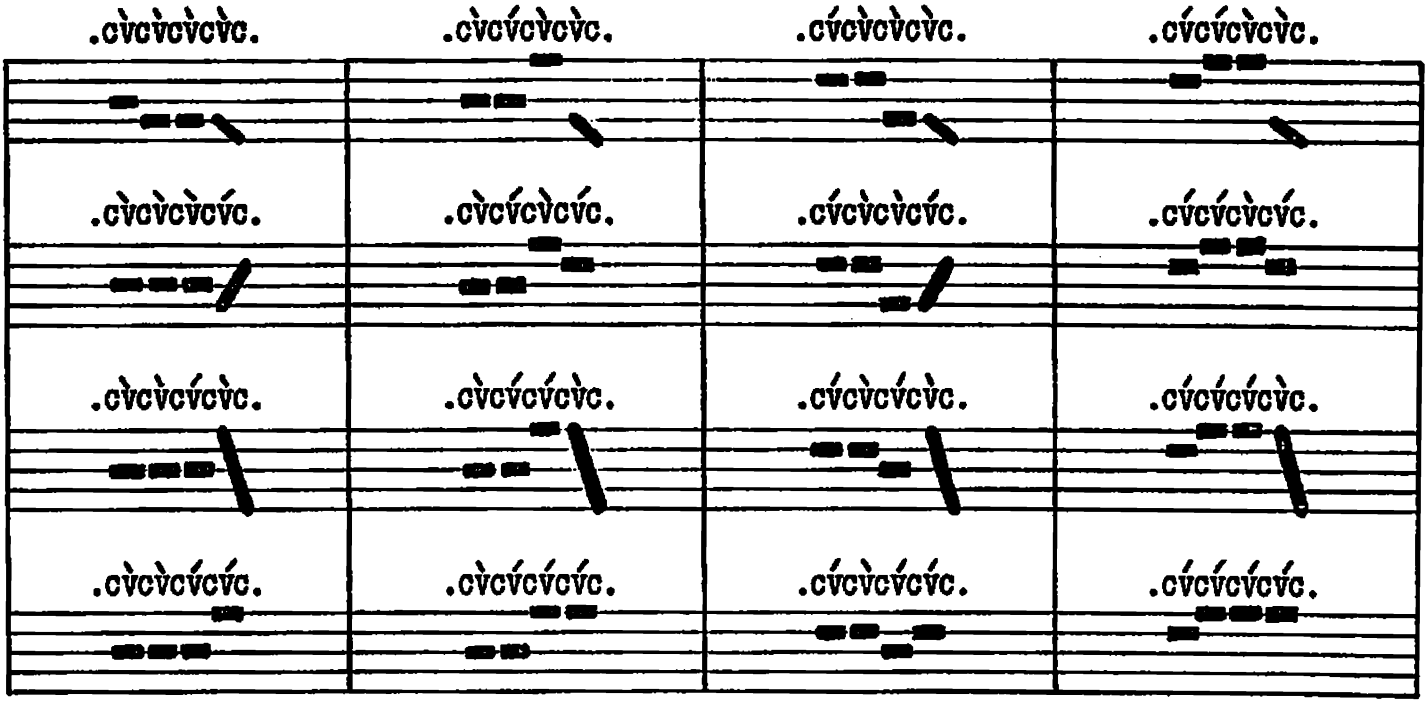

TABLE III. PITCH CONTOURS OF WORDS WITH FOUR SHORT SYLLABLE-NUCLEI

the occurrence of tonemes as do words that have all their syllable-nuclei short. Thus length of the final syllable-nucleus does not affect toneme distribution, and a final long syllable-nucleus normally carries only one toneme. The toneme is arbitrarily written on the second vowel of a geminate in the final syllable.

/sàmaàl/	'shell sp.'	/dìliìŋ/	'bird sp.'
/sàkaám/	'distant'	/dìliíŋ/	'thigh (bone)'
/sákaàm/	'flying fox sp.'	/bíliìl/	'barbed arrow'
/fákaáŋ/	'cheeky'	/ímniíŋ/	'brother-in-law'
/ùkuùm/	'bird sp.'	/ìloòt/	'a blazed trail'
/dùluúm/	'board'	/ìloób/	'half-caste'
/úkuùm/	'too short'	/íloòb/	'green blowfly'
/múluúm/	'nose'	/íboó/	'you (plural)'
/tìyaàb/	'feathered bag'	/nèleèn/	'bird sp.'
/mìyaák/	'bamboo spoon'	/bèleél/	'biting fly'
/bíyaàl/	'black palm sp.'	/démeèn/	'taro sp.'
/títaáb/	'wood chips'	/mémeél/	'vein, tendon'
/dùbàlaàb/	'vine sp.'	/ìmnòeèn/	'bird sp.'
/bìnìŋoók/	'star'	/dùlèbeén/	'lizard sp.'
/dìmínoók/	'grass sp.'	/dùmákoók/	'type headdress'
/àlíkaàb/	'whole'	/dàmánoòk/	'bird sp.'
/íntàbeèn/	'what?'	/átòkuùm/	'scorpion'
/ánìbeén/	'my mother'	/túfòbeén/	'yam sp.'
/díkíyoòŋ/	'crooked'	/tísóloòk/	'grasshopper sp.'
/díŋíloóm/	'wild raspberry'	/káŋéloók/	'sword grass sp.'
/mìlìleèb/	'night'	/àtàním/	'sun'
/àlìseéb/	'python sp.'	/tìsàlá/	'he didn't come (historic)'
/tùlúkeén/	'bird sp.'	/dèkékím/	'swallow sp.'
/bàtúkuùŋ/	'charcoal'	/fèlélìm/	'sweet potato sp.'
/dúbànbeè/	'he is burying him'	/túbdèkìm/	'taro sp.'
/kábùluúm/	'snake sp.'	/úlèsím/	'possum sp.'
/dúlámeèn/	'bird sp.'	/sálmánìm/	'owl sp.'
/kábúluúm/	'grasshopper sp.'	/fákálá/	'he planted them'

7.5 WORDS WITH FIRST SYLLABLE-NUCLEUS LONG

Words whose first syllable-nucleus is long (including monosyllables) exhibit twice as many contrastive pitch contours as words with all syllable-nuclei short.[7] It has been concluded from this that an initial long syllable-nucleus always carries two tonemes, one on each vowel of the geminate. All four toneme sequences /´´/, /`´/, /´`/ and /``/ occur on geminates in initial syllables, and there seem to be no limitations in their distribution with respect either to the consonants and vowels of that syllable or to the tonemes of the other syllables.

/dòòl/	'pandanus sp.'	/òòk/	'water'
/dòól/	'tree sp.'	/òók/	'thumb'
/dóòl/	'insect sp.'	/dóòt/	'fern sp.'
/dóól/	'forked'	/móók/	'type of stone adze'
/mòòm/	'my uncle'	/dèèŋ/	'happy'
/mòóŋ/	'wasp sp.'	/dèéŋ/	'27'
/móòŋ/	'tree sp.'	/k^{w}éèŋ/	'grasshopper'
/yóóm/	'flying fox sp.'	/tééŋ/	'arm'
/fèèt/	'arrow carving'	/dèèm/	'bird arrow'
/tèét/	'container'	/dèém/	'tree sp.'
/téèt/	'flower'	/séèŋ/	'quickly'
/ééb/	'Oksapmin salt'	/déém/	'frog sp.'
/dààl/	'pig arrow'	/fùùl/	'tree sp.'
/dàál/	'tired'	/fùút/	'plant shoots'
/sáàl/	'pandanus sp.'	/fúùt/	'quickly'
/máál/	'pandanus sp.'	/fúúl/	'cured food'
/ùùl/	'storage space'	/tììm/	'trunk, antinode'
/yùúl/	'antiphonal shouting'	/tìím/	'wild taro sp.'
/úùn/	'bird'	/tíìm/	'instead'
/yúúl/	'banana sp.'	/tíí/	'bamboo sp.'
/bààlìn/	'wide'	/k^{w}àànaàl/	'pancreas'
/òòlsák/	'anger'	/mùùmeén/	'my aunt'
/dàálìn/	'placed'	/dìímaàl/	'bird sp.'
/dàálín/	'Put it!'	/bàábeén/	'my elder sister'
/dóòlìn/	'born'	/náàkaàl/	'lizard sp.'

/dóòlí/	'I gave birth'	/néèbeén/	'bird sp.'
/dáálìn/	'planted'	/dáámaàl/	'pandanus sp.'
/dáálín/	'Plant it!'	/íínuún/	'grass sp.'
/nùùkùyùŋ/	'haze'	/dóònùlù/	'she gave birth...'
/tàànàmá/	'he can sharpen'	/dóònùmú/	'she can give birth'
/dùùtúkùl/	'bald'	/áàtúmàl/	'my uncles'
/dùùmánú/	'faded'	/máànílít/	'dog tooth ornament'
/dàálàtà/	'he put...'	/dáálàtà/	'he planted...'
/wàákùmeén/	'frog sp.'	/kéémàná/	'he showed himself'
/dàánálà/	'he put...'	/dáánálà/	'he planted...'
/dùúlálá/	'he butchered'		

7.6 PITCH CONTOURS OF WORDS WITH FIRST SYLLABLE-NUCLEUS LONG

The contours shown in Table IV are those which occur in the context /. --- ./. It may be noted that each of these contours is very similar to the corresponding contour for a word that has the same sequence of tonemes but all on short syllable-nuclei. For example, the contour [‾‾‾‾‾—] for CV̀V́CV̀CV́C is similar to the contour [— — ‾‾ —] for CV̀CV́CV̀CV́C.

7.7 STATUS OF LONG VOWELS

Long vowels in *Teléfól*, though contrastive with short ones, cannot be interpreted as geminates (VV) in the classical sense, since there are no non-suspect sequences of unlike short vowels to provide a basis for such an interpretation.[8] The traditional approach would be to treat these long vowels either as single phonemes /a:/, /e:/, /i:/, /o:/, /u:/ or as the short vowel phonemes plus a length phoneme /ː/.

However, initial long syllable-nuclei always contain or carry two tonemes, and such toneme pairs have phonetic characteristics similar to toneme sequences on two successive short syllable nuclei. This situation suggests an analysis of the long vowels in initial syllables as sequences of two identical short vowel phonemes, each carrying a toneme. Such a vowel cluster could be regarded either as a long syllable-nucleus or as a sequence of two short syllable-nuclei. Because of the lack of diverse sequences of short vowels, the analysis as a long syllable-nucleus seems to be the better alternative.

Unfortunately, the analysis of a long vowel as a geminate

vowel or long syllable-nucleus runs into difficulties in final syllables, where long vowels normally carry only one toneme. One could say that the 4-way toneme contrast on long vowels is neutralized to a 2-way contrast in final syllables. However, whatever one says about this asymmetry in the distribution of tonemes, there is no longer any tonal basis for interpreting long vowels in final syllables as geminates.

This leaves us with three types of analysis, each of which has unsatisfactory features.

(a) All long vowels are regarded as geminates (VV). In initial syllables each vowel of the geminate carries a toneme, but in final syllables only one vowel of the geminate carries a toneme. This interpretation involves toneme neutralization.

(b) All long vowels are single phonemes (V:). In initial syllables long vowel phonemes always carry two tonemes, elsewhere long vowel phonemes carry one toneme as do short vowel phonemes. This interpretation involves the occurrence of two tonemes on a single vowel.

(c) Long vowels in initial syllables are regarded as geminates (VV) and in final syllables as single phonemes (V:). Each vowel phoneme carries one toneme. This interpretation is reminiscent of Firth's polysystemic approach and is the simplest description of toneme distribution. However, it involves long vowel phonemes that occur only in final syllables.

Analysis (a) has been adopted in this paper.

8. JUNCTURE

Certain tonal and consonantal allophones are characteristic of word-initial or word-final position. These word boundary or junctural allophones were first tentatively identified for monomorphemic utterances bounded by pause and final intonemes. Then further investigation showed that the phenomena so identified only occurred at morpheme boundaries, and in turn such morpheme boundaries were considered as occurrences of a juncture phoneme.[9] In most cases, such "phonological words" are also "grammatical words". However, occasionally the phonologically and grammatically determined word boundaries do not coincide.

A juncture that lies within a grammatical word (that is, a phonological word boundary that is not a grammatical word

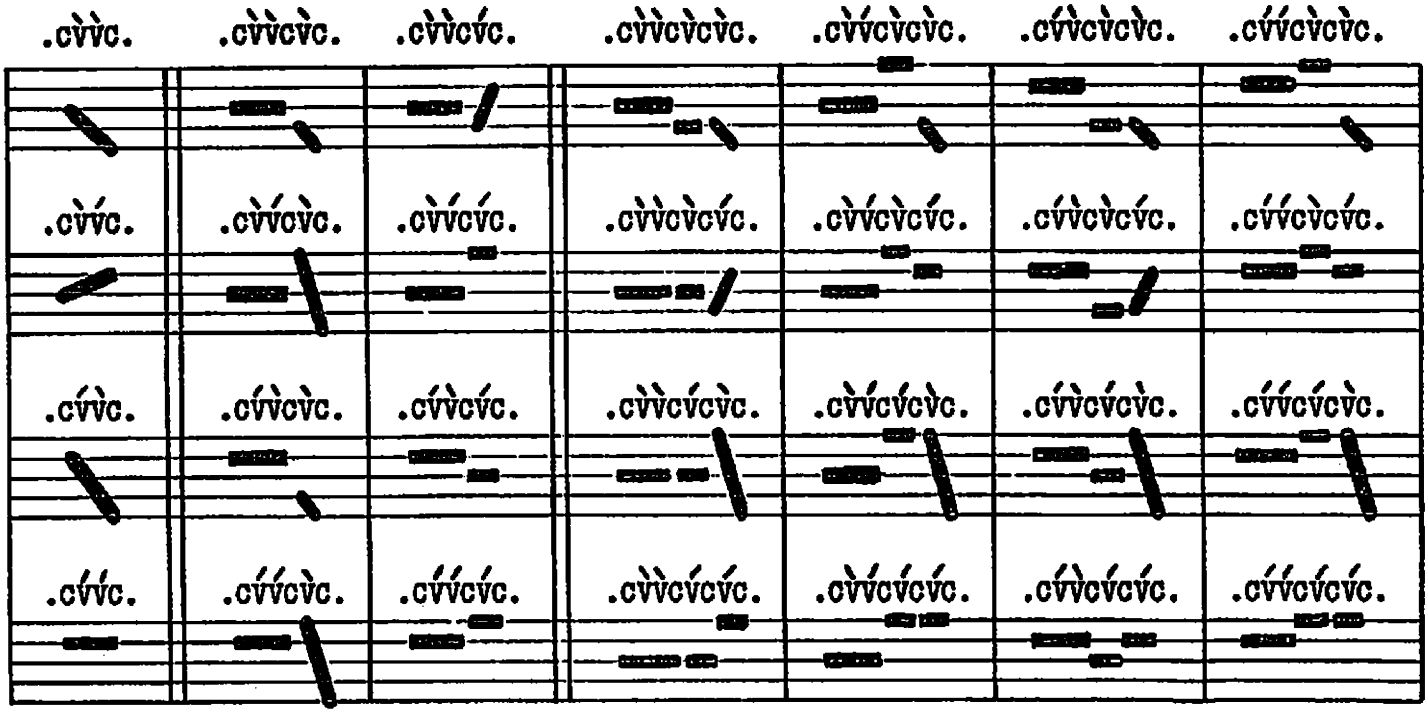

TABLE IV. PITCH CONTOURS OF WORDS WITH INITIAL SYLLABLE-NUCLEUS LONG

boundary) is termed an INTERNAL JUNCTURE. Internal juncture marked by # and external juncture marked by space or punctuation are phonologically identical, representing one and the same juncture phoneme. The two ways of marking juncture are adopted as a convenient device for distinguishing certain grammatical properties based on tactics rather than phonology.

8.1 TONAL EVIDENCE

All of the pitch contours presented so far pertain to single words. Most of them occur on monomorphemic words. The contours for which no monomorphemic examples have yet been observed occur on polymorphemic words whose status as single words is not in doubt. For example, words containing noun derivational suffixes /-im/, /-een/, /-aal/, /-ook/, kinship and personal name plural suffix /-al/, noun and adjective verbalizing suffix /-an/, and verbal neutral tense endings /-a/, /-la/, /-ma/, /-u/, /-lu/, /-mu/, etc., and combinations thereof, are undoubtedly single words.

During the analysis of tonal data several pitch contours were discovered additional to those presented so far. These contours (shown in Table V) never occur on monomorphemic words, and in fact they are identical with some of the many pitch contours that occur on sequences of two words. However, these occurrences are worthy of careful attention, since they involve morpheme sequences which all along had been assumed to be single words. All of these contours have as their chief feature an unexpected step in pitch between two successive syllables, for example high to low or low to high. A morpheme boundary always occurs between the two syllables involved in the pitch step. An investigation of these occurrences has, in some cases, resulted in a decision that two words are involved, and in other cases has led to the postulating of an internal juncture. Thus, an unexpected high-low step is interpreted as the sequence UP-JUNCTURE-DOWN, and an unexpected low-high step as the sequence DOWN-JUNCTURE-UP. Junctures have not been (cannot be?) contrastively detected between like tonemes by tonal evidence. Some common occurrences of internal juncture marked by tone are listed below.

(a) The imperative utterance terminal /à/ ~ /yà/ was regarded for a long time as a suffix because it immediately follows the verb without pause. However, it was discovered that when /à/ follows a verb with final UP toneme, it has allotones that would be expected for a separate word rather than a suffix. Further grammatical enquiry indicated that

/à/ occurs after several different types of verb in an imperative sense, and after complete utterances in a quotative imperative sense. E.g. /aìì k^{w}à./ 'Good morning.', /sìì k^{w}à yà./ 'Say, "Good morning"!'. This grammatical freedom of occurrence seems sufficient to warrant treating /à/ as a separate word rather than as a suffix. E.g. /kú yà./ rather than /kú#yà./ 'Take it!'. These two-word pitch contours of the imperatives are different from single-word contours whenever the word that the /à/ follows is either a short monosyllable with /´/ or a longer word with /` ´/ as the last two tonemes.

Variant with internal juncture /#/	*Approximate meaning and distribution*	*Free variant*	*Suffixial variants and distribution*
/#bàlá/	heteropersonal	/bàlá/	--
/#sàlá/	heteropersonal	/sàlá/	--
/#kàlá/	heteropersonal	--	--
/#sìì̀t/	'soon', punctiliar	/sìì̀t/	/-siì̀t/ continuative
/#òóm/	'soon', punctiliar	--	--
/#bòóm/	'later', punctiliar	/bòóm/	/-boòm/ continuative
/#sòóm/	'later', punctiliar	/sòóm/	/-soòm/ continuative
/#bòómá/	habitual, closed	/bòómá/	/-bòmà/ open
/#nàmá/	abilitative, closed	/nàmá/	/-nàmà/ ~ /-námà/ open
/#bàláb/	present, closed	/bàláb/	/-bàlàb/ ~ /-bálàb/open
/#sàláb/	far past, closed	/sàláb/	/-sàlàb/ ~ /-sálàb/open
/#bòóntèmá/	'tomorrow' future	/bòóntèmá/	--
/#nákbeè/	recent habitual	/nákbeè/	--
/#nák#bàláb/	recent habitual	/nák#bàláb/	--
/#kòl/	continuative for certain verb stems, preceding /o/	--	/-kàl/ ~ /-kùl/ preceding /a/;[U]/i/ and /u/

TABLE VI. VERB ENDINGS WITH INTERNAL JUNCTURE.

(b) Verbs containing the endings listed in Table VI show pitch contours characteristic of two words rather than of single words.[4] Recent habitual verbs ending in /#nákbeè/ and /#nák#bàláb/ have contours not observed in single words, whenever these endings follow a verb stem whose last two

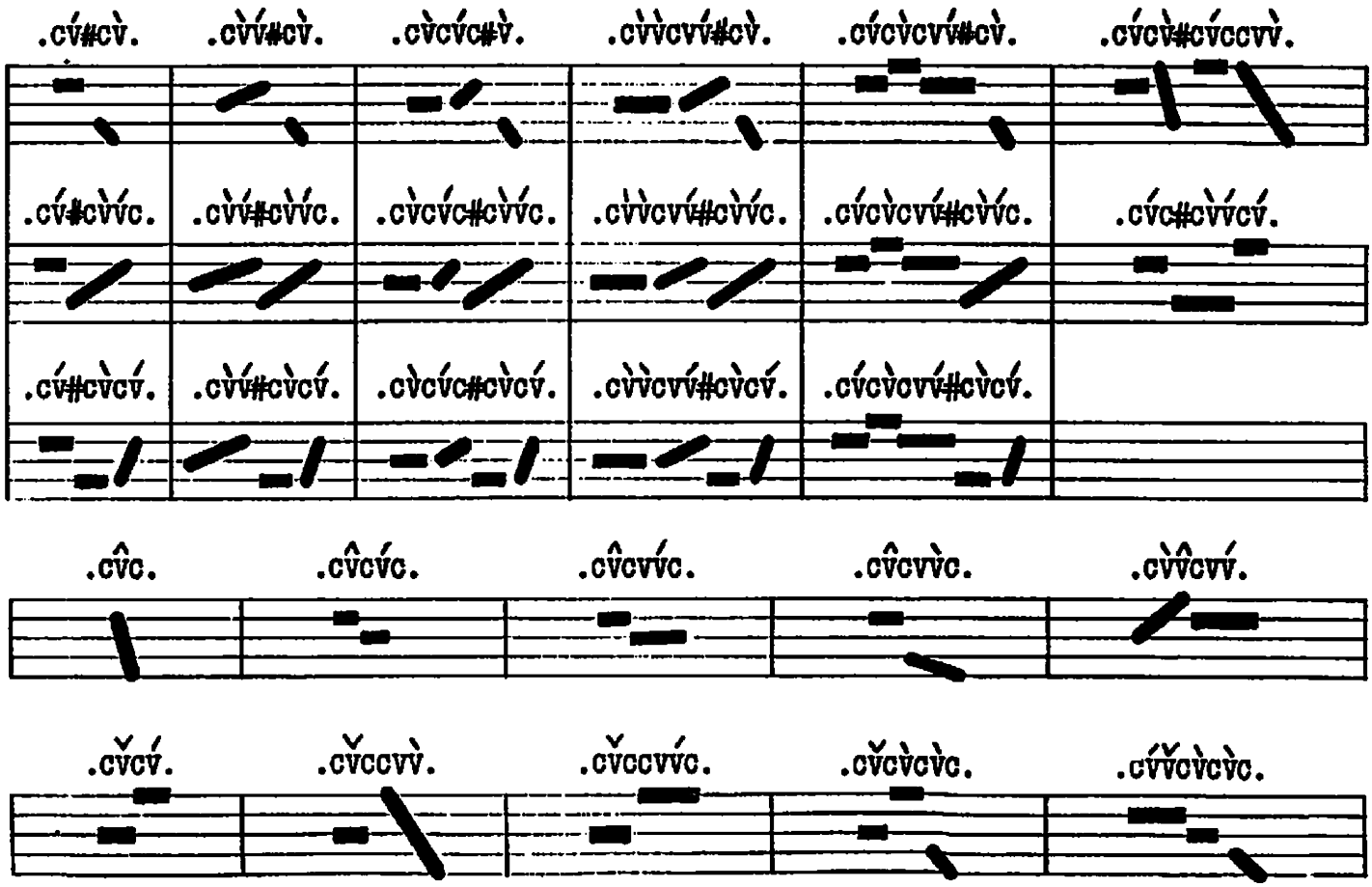

TABLE V. PITCH CONTOURS OF WORDS WITH JUNCTURE OR CONTRACTION

tonemes are /´`/. (There are no short monosyllabic verb stems with /`/.) For all the other endings contours that are specific to two-word sequences are observed whenever these endings follow a short monosyllabic verb stem carrying /´/ or a longer stem whose last two tonemes are /`´/. All of these endings have been tentatively regarded as part of the same grammatical word with the verb stem rather than a separate word. E.g. /kú#nàmá/ rather than /kú nàmá/ 'he can take it'. The reasons for this grammatical decision are our next concern.

It is true that for many of these endings there is a corresponding and identical form (except that juncture is written by space instead of #) which occurs as a separate free verb. In Table VI /sòóm/,/sàlá/, and /sàláb/ are forms of the verb 'to spend the night' and all of the others are forms of the verb 'to be'. However, although this suggests that these verbal endings should be treated as separate words, there are two types of evidence pointing in the opposite direction.

Firstly, for many of these endings there are corresponding forms differing only in tone and the absence of juncture which occur as undoubted verbal suffixes. In the case of /#bàláb/ and /#sàláb/ there is the additional fact that other persons ('I', 'he', 'she') for these same tenses are clearly suffixial in form. One consequence of the toneme distribution discussed in 7.7 should be pointed out in passing. Whereas a long vowel of a monosyllabic suffix carries only one toneme, the same morpheme carries two tonemes both when it is a free word and when it is a grammatically bound phonological word. For instance, the suffix /-soòm/ carries only /`/, but both /sòóm/ and /#sòóm/ carry /`´/. (See Table VI.) This is one of the important aspects of the tonal properties of internal juncture.

Secondly, a final /m/ of verb stems (mainly continuative stems) is lost before endings commencing with /#b/. E.g. /fúkún/ 'think', /fúkún#bòómá/ 'he always thinks'; but /ífúm/ 'serve food', /ífú#bòómá/ 'he always serves food'. This reduction is not a general type of sandhi but is unique to verbal endings (including suffixes). Furthermore, in many cases the resulting m-less variant of the verb stem is unique to these forms of the verb. E.g. */ifú/ 'serve food' does not occur as a free word in any other context. There is no precedent for its occurrence in isolation or in periphrastic verbs.

Note that forms with final /-á/ in Table VI have this to mark the subject as 'he', and tonally identical forms with

final /-í/ 'I', /-áb/ 'you', /-ú/ 'she', /-úb/ 'we', and /-íb/ 'you/they' instead also occur. Forms terminating in /-àláb/ 'you' have analogous forms terminating in /-ùlúb/ 'we' and /-ìlíb/ 'you/they' also.

(c) The morphemes /sòó/ 'and', 'with', and /mín/ 'and', 'or' were originally thought of as being suffixed to the preceding word. But after considering the pitch contours involved and the wide range of word classes which they follow, it was decided that they are both phonologically and grammatically free. Thus, /tànúm sòó/ rather than /tànúm#sòó/ or /tànúmsoó/ 'with a man'. It should be pointed out that the first of these does have a suffixial allomorph occurring with pronoun stems (e.g. /nìsoó/ 'with me') and in several derived words (mostly adjectives): /àfálìkénsoó/ 'fairly large'; /kùmúnsoó/ 'pregnant'; /kàfánsoó/ 'living'; /mèébsoó/ 'near'; /mààksoó/ 'more'.

(d) Several morphemes that frequently occur as the final element in place names exhibit pitch contours characteristic of free words rather than suffixes. Because of the large and open class of place name "stems" preceding them, it has been tentatively decided to treat these final elements as separate grammatical words rather than to invoke an internal juncture: /tìbín/ 'headwaters'; /bìíl/ 'mid valley'; /kòót/ 'slopes'; /yákán/ 'crossing', 'ford'; /tìkiín/ 'mountain', 'hill'.

(e) The location indicator /kàl/ ~ /kál/ 'at' is phonologically a separate word. It has a measure of grammatical versatility also, and is considered a grammatically free word. It should be mentioned that with two of the numerals /-kàl/ behaves as a suffix: /búkúbkàl/ 'six';/tùkàl/ 'nine'. With another numeral and four demonstratives (D2) there is suffixation involving a unique reduction of anticipated /kk/ to /k/:

/òók/	/òókál/	'five'
/kèék/	/kèékál/	'across here'
/k^{w}èék/	/k^{w}èékál/	'across there'
/kàlaák/	/kàlákál/	'down here'
/kùlaák/	/kùlákál/	'down there'

(f) About 20% of verbs are obligatorily marked for the object person. For some verbs the object person morphemes are prefixes and for other verbs the object person morphemes are separated from the following verb stem by an internal juncture, especially for punctiliar forms of such verbs.

The markers are /nám#/ 'me', /kám#/ 'you', /dúb#/ 'him', /kúb#/ 'her', and /ím#/ 'us', 'you', 'them'. Whenever these precede verb stems whose first toneme is /`/ pitch contours are observed that are normally characteristic of two words rather than a single word. Some examples are: /nám#kàálú/ 'she left me', /kúb#kùkuùb#éèlá/ 'he tried it out for him', /dúb#sùùn dàálíb/ 'they insulted him in song'. The reason for not regarding these object person morphemes as free words is that most of the verb roots which they precede do not occur alone as verb stems. Thus, an analysis of /nám#kàálú/ as /nám kàálú/ 'she left me' would be breaking all precedent since neither /nám/ nor /kàálú/ occur elsewhere as free words.

8.2 CONSONANTAL EVIDENCE

Most consonants do not provide clear allophonic evidence for the boundaries of phonological words. The three phonemes /b/, /k/ and /l/ which have positionally determined allophones in the list in section 3.1 tend to have their syllable-final allophones replaced by their intervocalic allophones when followed without pause by a word with initial vowel, and replaced by their pre-consonantal allophones when followed without pause by a word with initial consonant. The nett result is that the allophones of word-final consonants provide no consistent clues for identifying the word boundary.

On the other hand the syllable-initial allophones of /b/ and /k/ are maintained in word-initial position irrespective of whether pause, vowel, or consonant precede them. These then provide clues for identifying junctures when the preceding word ends in a vowel.

(a) The untranslatable phrase modifiers /kì/ and /kìmín/ always have initial [k^h] and hence have been regarded not as suffixes, but as forms preceded by juncture. Originally it was thought that these two forms only occurred following -tá series and -ó series pronouns, but careful examination has revealed that they follow a wide range of word classes. It has finally been decided to regard these two forms as free words rather than as forms involving internal juncture.

(b) Benefactive continuative verbs marked for second person beneficiary have [k^h] in the middle of what had at first been assumed to be a single word. Interpreting this as the evidence of a preceding juncture phoneme results in the morphology of the benefactive verbs having much closer parallels with that of non-benefactive verbs. The part of

the verb preceding the juncture is the continuative stem, and the part following the juncture consists of object prefix (constituting a benefactive "stem") plus normal tense and subject-person suffixes. However neither of these two parts of the benefactive continuative verb form occur elsewhere in the syntax of *Teléfól*, so they are regarded as being separated by an internal juncture rather than being two grammatically free words. For example, /bákaà#kèèmìn/ rather than /bákaà kèèmìn/ 'to tell you'.

8.3 PHONETIC LENGTH AS EVIDENCE

The following tentative generalizations may be suggested on the basis of sections 2.2 and 6.2. In words commencing with the pattern CVCV(C)... the first vowel is phonetically one half or less of the length of the second vowel. On the other hand, in a pattern fragment ...CVCV(C)... that is medial or final in a word, the first vowel is never shorter than the second. Thus the ratio of the phonetic length of the two successive single vowels in the pattern fragment CVCV(C) is a clue as to whether this fragment is preceded by juncture or not. In Table VI the internal juncture of the forms /#bàlá/, /#sàlá/, /#kàlá/, /#nàmá/, /#bàláb/, and /#sàláb/ cannot be detected following a verb stem ending in a DOWN toneme on the basis of tonal evidence, but the presence of the internal juncture can be demonstrated by the relative shortness of the first vowel in each of these forms. For example, phonetic length is the only clue to the juncture contrast in the following pair of utterances: /fùùsàláb/ 'you did not cook it', /fùù#sàláb/ 'you cooked it'.

8.4 NEUTRALIZATION OF JUNCTURE

From the above discussion it may be seen that the circumstances under which juncture may be identified are quite limited - at pause, between the second and third tonemes of the sequences /ˋ ˊ ˋ/ and /ˊ ˋ ˊ/, preceding the pattern CVCV(C)..., or preceding /b/ or /k/. It seems reasonable to assume that juncture occurs in other contexts also, and the question arises of how to detect it there.

The following procedure has been adopted in the analysis of *Teléfól*. If an utterance contains a string of morphemes AB which may be divided into two shorter strings A and B, and if A occurs in other utterance environments followed by a clear juncture, and if B occurs in other utterance environments preceded by a clear juncture, then the sequence AB in the original utterance is regarded as containing a juncture between A and B, unless there is definite phonological

evidence of compounding. Thus a suspected juncture that has no phonological evidence to support it within a particular utterance may be identified by testing the morphemes on either side of it in other environments where pause or juncture allophones could appear.

This procedure is based on the assumption that the occurrence of juncture at its boundary is a stable property of a morpheme and the potential for this occurrence of juncture is in fact an integral part of the morpheme just as much as the consonants, vowels and tones are.[10] This potential is normally actualized as a juncture if the contiguous morpheme also has a potential at the same boundary. The potential is not actualized if the contiguous morpheme does not also have a potential at the same boundary, i.e. is an affix or clitic.[5]

The postulating of juncture within an utterance which of itself contains no phonetic evidence of its presence is not consistent with the usually accepted principles of phonemic analysis. This involves the juncture phoneme in having a zero allophone in many contexts. Or put in another way, the contrast between the presence and absence of juncture is neutralized in contexts other than those listed in the first paragraph of 8.4. The writing of juncture in such contexts constitutes a morphemic transcription rather than a phonemic one.

All of the discussion in 8.4 concerns the identification of juncture by phonological evidence, and applies equally to both internal and external juncture. The distinction between internal and external juncture is not based on phonology but on grammatical considerations. The distinction between the two in the transcription is purely a concession to simplicity of grammatical and morphophonemic description.

8.5 CONTRACTIONS

Some further pitch contours (see Table V) appear on words containing contracted syllables, and some of these contours are similar to ones for sequences containing juncture. When two syllables contract into one, the two tonemes of the original syllables are usually both retained on the single syllable that results. On contracted syllables UP-DOWN is written (ˆ) and DOWN-UP is written (ˇ). For example, /núkùm/, /nûm/ 'my friend'; /ánìbeén/, /âbeén/ 'my mother'; /ùtámàmìn/, /tǎmàmìn/ 'see', 'know'. Another possibility is the contraction of a long initial syllable to a short one: /téè tám/, /tîtám/ 'up past'; /téè íít/, /tîiít/ 'up past'; /téè dàák/, /tîdàǎk/ 'down past'; /téè tòòb/, /tîtoòb/ 'down

past'. Another type of contraction involves vowel elision: */kòó ìleé/ > /kòôleé/ 'now'; */bòó ìleé/ > /bòôleé/ 'then'.

Most motion verbs ending in /ǐnèmìn/ have tone patterns that can only be explained by fusion of a form ending in /ii/ or /ee/ and having /ˆˋ/ as its final two tonemes with the verb /únèmìn/ 'to go'. For example: /àm éè únèmìn/ > /àm#íǐnèmìn/ 'to go home'; /dàákeè únèmìn/ > /dàákǐnèmìn/ 'to depart'; /téè únèmìn/ > /tíǐnèmìn/ 'to go past'; /bílìì únèmìn/ > /bílǐnèmìn/ 'to run away'; /bòkoòb#éè únèmìn/ > /bòkoòb#íǐnèmìn/ 'to tell him and go'

In a few words some of these same patterns occur but the nature of the contraction is not clear: /ûnaák/ 'baby'; /âtaál/ 'grandfather'; /nǐnteém/ 'not be'.

8.6 CLITICS AND COMPOUNDS

Some morphemes have the grammatical versatility of words and yet are phonologically bound to the preceding morpheme. For instance, the predicate modifier /-tàb/ 'perhaps' might be considered a clitic.

8.7 CONFLICTING EVIDENCE

It seems that the tonal and consonantal evidence occasionally indicate different decisions with regard to juncture. For instance, the utterance terminal /kòò/ usually has initial [g] characteristic of a suffix, but a low pitch characteristic of a free word. (This latter may possibly be attributable to the presence of a final intoneme.) On the other hand, /kì/ (phrase modifier) always has initial [k^h] characteristic of a free word, but tends to have a falling pitch characteristic of a suffix.

9. SANDHI

The changes of phonemes that take place when morphemes occur in sequence within the same phonological word constitute INTERNAL SANDHI and those changes that occur when morphemes occur in sequence separated by a juncture constitute EXTERNAL SANDHI.

9.1 CONSONANTAL SANDHI

Both internal and external sandhi include the following frequently occurring changes (most examples are of internal sandhi):

/mm/ > /m/ /ùtám/ 'see it' + /-mànsá/ 'he yesterday' > /ùtámànsá/ 'yesterday he saw it'

/nn/ > /n/	/fúkún/ 'think' + /-nùbá/ 'he does' > /fúkúnùbá/ 'he thinks'
/tt/ > /t/	/sììt/ 'soon' + /-tà/ connective > /sììtà/ 'soon'
/ŋt/ > /ŋk/	/yáŋ/ 'go along' + /-tà/ connective > /yáŋká/ 'go along'
/kt/ > /kk/	/yák/ 'go across' + /-tà/ connective > /yákká/ 'go across'
/td/ > /d/	/àt/ 'tree' + /dùm/ 'fruit' > /àdùm/ 'fruit'
/ts/ > /s/	/àt/ 'tree' + /sàn/ 'seed' > /àsàn/ 'seed'
C/w/ > C	/ìmuúk/ 'heavy' + /wèéŋ/ 'word' > /ìmuúk éèŋ/ 'deep voice'
C/y/ > C	/dééb/ 'get' + /yáŋ/ 'along' > /dééb áŋ/ 'put it along'

Other changes seem to be limited to internal sandhi, and are tendencies rather than fixed "rules". The author's two informants differed in the frequency of usage of most of these types of sandhi.

/bf/ > /f/; /lf/ > /f/; /lb/ > /bb/; final /t/ > intervocalic /s/; /mb/ > /b/ in verbs only.

9.2 VOCALIC SANDHI

(a) Vowel harmony occurs as one type of internal sandhi, but is limited to the instances listed in 6.4.

(b) When a sequence of two morphemes would be expected to result in a sequence of two vowels, quite often there is an accretion of /y/ at the transition point. This phenomenon occurs both internally and externally, but seems to be the property of certain specific morphemes rather than a general "rule".

/-àl/ ~ /-yàl/ plural suffix:
/sàmaá/ 'in-law', /sàméyál/ 'in-laws'

/#èèmìn/ ~ /#yèèmìn/ (after /u/) benefactive:
/fùù/ 'cook', /fùù#yèèmìn/ 'cook for him'

/à/ ~ /yà/ imperative utterance terminal:
/bókoò/ 'talk', /bókoò yà/ 'Say it!'

/ákà/ ~ /yákà/ (some speakers only) interrogative utterance terminal:

/fùúláb ákà/ 'Did you cook it?' /fùúlá yákà/ 'Did he cook it?'

/òó/ ~ /yòó/ quotative marker:

/fùúlíb òó àkélá/ 'he said they cooked it', /fùúlú yòó àkélá/ 'he said she cooked it'

/àm/ ~ /yàm/ 'house', 'country':

/úlòtù/ 'church', /úlòtù yàm/ 'church building'

(c) On the other hand, when a sequence of two morphemes would be expected to result in a sequence of two vowels, quite often one of the vowels is elided. This phenomenon occurs both internally and externally. No phonological basis has yet been discovered for predicting which of the two vowels will be elided. This appears to be a property of the individual morphemes:

/úyoó/ 'her', 'it' tends to drop its initial vowel when the preceding word (usually a verb) has a final vowel: /tálá/ 'he came', /tàlá yóó/ 'his coming'. The other pronouns /íyoó/, /útá/, /ítá/, etc. also sometimes drop their initial vowel.

/nímí/ 'my' and the other pronouns of the -mí series tend to drop their final vowel when the following word (usually the possessed noun) has an initial vowel: /ábiìb/ 'village', /ním ábiìb/ 'my village'.

The suffix /-ìleé/ 'and' has the allomorph /-leé/ following vowels: /fùùlìbìleé/ 'they cooked it and', /fùùlùleé/ 'she cooked it and'.

The exclamation /wàákuù/ 'No!' and the interrogative utterance terminal /ákà/ change their final vowels to single /o/ (with the same toneme) when followed by the quotative marker /òó/ as a clitic: /wàákòoó àkélá/ 'he didn't want to' (he said, "No!"), /tálá ákòoó àkélá/ 'he asked whether she came' ("Did she come?" he asked). Furthermore, the exclamation /ùù/ is completely elided before /òó/: /òó àkélá/ 'he agreed' (he said, "Yes").

Many other uncatalogued occurrences of elision have been observed.

It should be mentioned that, although vowel elision is more frequent than the accretion of /y/, the occurrence of

vowel sequences without either type of sandhi is far more frequent than either of these.

(d) Another form of vocalic sandhi is the allomorphic alternation of long and short vowels that occurs as a direct consequence of the neutralization of vowel length in medial syllables as described in 2.3. When a suffix is added to a stem whose isolation form has a long vowel in its final syllable, this syllable then becomes medial, and, in terms of the analysis adopted in 2.3, the vowel is a single one in this medial position. E.g. /átaàn/, /átàním/ 'sun'; /bókoò/ 'say', /bókòlá/ 'he said'.

9.3 INTERNAL TONAL SANDHI

(a) Several noun suffixes show tonal dissimilation, the first toneme of the suffix being opposite to the last toneme of the stem. This is true of the derivational suffix /-eèn/ ~ /-eén/, and of the personal name suffixes /-èŋím/~ /-éŋím/, /-èŋaàl/ ~ /-éŋaàl/, /-èŋoók/ ~ /-éŋoók/, /-ìníb/~ /-íníb/, /-ìnaàl/ ~ /-ínaàl/, and /-ìnoók/ ~ /-ínoók/. For example, /tóloòb/, /tólòbeén/ 'possum sp.'; /ùmoó/, /ùmóeèn/ 'insect sp.'.

(b) Two derivational noun suffixes show a mixture of tonal assimilation and dissimilation, /-ím/ ~ /-ìm/ and /-oòk/ ~ /-oók/. The distributional trend of /-ím/ ~ /-ìm/ is as follows: if the last two tonemes of the noun stem are both UP then /-ìm/ occurs; in all other situations /-ím/ occurs. In the case of /-oòk/ ~ /-oók/, if the second last toneme of the noun stem is DOWN there is assimilation of the toneme of the suffix to be the same as the final toneme of the stem. If the second last toneme of the noun stem is UP or if the stem has only one toneme, then there is dissimilation of the toneme of the suffix to be the opposite of the final toneme of the stem.

(c) Other noun suffixes are relatively tonally invariant: derivational suffix /-aàl/, plural suffix /-àl/, personal name suffixes /-eén/,/-sìmeén/, /-oòk/, /-noòk/, /-sìmnoòk/, and /-seéb/. "Relatively" allows for a small number of non-systematic tonal variants.

(d) One verbal suffix exhibits tonal dissimilation as described in (a) above: /-ìnteém/ ~ /-ínteém/ negative reply. Three other endings appear to show the same kind of dissimilation, but actually involve regressive assimilation, and are described under (g) below.

(e) Several open verbal endings in Table VI exhibit tonal assimilation, the toneme of their first syllable being the

same as the last toneme of the stem: /-nàmà/ ~ /-námà/ 'he can', /-sàlàb/ ~ /-sálàb/ 'you did', /-bàlàb/ ~ /-bálàb/'you are doing', and /-nàlà/ ~ /-nálà/ 'he ..' (homopersonal).[4] In addition to these, the continuative benefactive endings (which are separate phonological words as is shown in 8.2(b)) all show a similar type of assimilation. For example, /fùù#yèèmìn/ 'to cook for him', /kú#yéèmìn/ 'to get it for him'. Verbal connective suffix /-tà/ ~ /-tá/ also shows assimilation.

(f) The majority of verbal suffixes are tonally invariant with respect to any influence the tonemes of the preceding stem or suffix might have on them. Among these are all of the monosyllabic subject-person suffixes, the negative suffix /-àl/, the customary suffix /-ìn/, the open yesterday past suffix /-màns/, the future suffix /-àntèm/ ~ /-àntém/ ~ /-óntèm/, the unfulfilled obligation suffix /-ànàkìn/ ~ /-ónákìn/, one variant of the abilitative suffix /-oóm/, and the connective suffix /-ìleé/ ~ /-leé/. All of the endings set off by juncture listed in Table VI are also tonally invariant.

(g) One trend that is apparent with several suffixes is that a monosyllabic suffix carrying an UP toneme, when added to a stem whose two final tonemes are both DOWN, gives rise to regressive assimilation in that the final toneme of the stem changes to an UP toneme. For instance: /fùfaàl/, /fùfálím/ 'bird sp.'. This is a regular characteristic of subject-person suffixes when they are carrying an UP toneme in a closed verb form, and they follow the stem or any suffix other than /-àl/ negative. For example: /bòò/ 'slash', /bóólá/ 'he slashed it'; */bòòlàntèm/ 'will slash', /bòòlàntémá/ 'he will slash' (compare /bòòlàntèmàlá/ 'he will not slash').

In closed verbs the tense suffixes /-màns/ ~ /-máns/ 'yesterday', /-nùb/ ~ /-núb/ 'always', and /-bìl/ ~ /-bíl/ 'often' appear to exhibit tonal dissimilation with the final syllable of the stem to which they are attached. E.g. /bòò/ 'slash', /bòòmánsá/ 'he slashed yesterday'; /kú/ 'get it', /kúmànsá/ 'he got it yesterday'. However, a consideration of the forms containing the sandhi-free negative suffix /-àl/ (e.g. /bòòmànsàlá/ 'he did not slash yesterday', /kúmànsàlá/ 'he did not get it yesterday') indicates that these three tense suffixes may be regarded as having a basic allomorph with DOWN toneme and an allomorph with UP toneme by regressive assimilation with the UP toneme of the following subject-person suffix. As indicated in the preceding paragraph this regressive assimilation only takes place when

the two syllables preceding the subject-person suffix (that is, the last syllable of the stem and the tense suffix) both have basic DOWN tonemes. Thus:

*/kúmàns/ + /-á/ > /kúmànsá/ 'he got it yesterday'
*/bòòmàns/ + /-á/ > /bòòmánsá/ 'he slashed yesterday'

(h) A few stems ending with two UP tonemes change their final toneme to DOWN when a suffix with UP is added to them. For example, /àfálík/, /àfálìkeén/ 'big'; /kútáb/ 'ashes', /kútàboók/ 'talcum powder'.

9.4 EXTERNAL TONAL SANDHI

In continuous speech the tonemes that are carried by a word in isolation are often changed under the influence of the preceding word. The modified toneme sequence carried by a word in continuous speech (that is, its sandhi form) is quite independent of its tonal form when uttered in isolation, and is determined solely by the last two tonemes of the preceding word.

(a) Words of one toneme (short monosyllables) have sandhi forms that are phonologically bound to the preceding word as compounds. These words have two sandhi forms in addition to their isolation form. After a word of a single UP toneme or a word ending in DOWN-UP the sandhi form is UP; after all other types of words the sandhi form is DOWN. For instance, the fruits (/dùm/) of various types of trees illustrate this rule:

/yál/, /yáldúm/; /àmiít/, /àmídúm/; /fàl/, /fàldùm/;
/yàà/, /yààdùm/; /ákúm/, /ákúmdùm/; /bíyaàl/, /bíyàldùm/.

Other monosyllables showing this sandhi are /sàn/ 'seed', /àt/ 'tree' and /àm/ 'region'.

(b) Words of two or more tonemes (monosyllables with long nuclei and polysyllabics) have sandhi forms that are separate phonological words. This conclusion is based on the consonantal and length evidence; the tonal evidence is inconclusive. These words also have two sandhi forms which are assimilative in nature, in addition to their isolation form. When the final toneme of the preceding word is DOWN the sandhi form consists of DOWN on all syllables; when the final toneme of the preceding word is UP the sandhi form consists of the first toneme UP and all subsequent tonemes DOWN. This may be illustrated by the barks (/kààl/) of various trees:

/yál/, /yál káàl/; /àmiít/, /àmiít káàl/; /fàl/, /fàl kààl/; /yàà/, /yàà kààl/; /ákúm/, /ákúm káàl/; /bíyaàl/, /bíyaàl kààl/.

It may be further illustrated by various nouns followed by the adjective /kàtíb/ 'small' (isolation form):

/mùùn/	'old garden',	/mùùn kàtìb/	'small old garden';
/k^{w}éèŋ/	'grasshopper',	/k^{w}éèŋ kàtìb/	'small grasshopper';
/tànúm/	'man'	/tànúm kátìb/	'small man';
/ímán/	'taro',	/ímán kátìb/	'small taro'.

It is important to note that the presence or absence of external tonal sandhi is sometimes contrastive and contrastive transcription is essential. In the following examples the non-sandhi form is given first:

/nímí sàŋ/	'my story-telling' (/nímí/ 'my')	/nímísàŋ/	'(tell) about me'
/nímí àkeèt/	'my thoughts'	/nímí ákeèt/	'(think) about me'
/kóól tèém/	'hole for a ground-oven'	/kóól téèm/	'in a ground-oven' (/kóól/ 'ground-oven')
/àt dìím/	'up a tree' (/àt/ 'tree')	/àt dììm/	'on a tree (log)'

Several morphemes (including quotative markers /òó/ and /kàlaá/ and the connective /kàleé/ 'so', 'and') seem to have both non-sandhi and sandhi forms which involve no change of meaning but which are related to speed of utterance or to the occurrence of pause.

(c) Two short monosyllabic function morphemes, /kàl/ ~ /kál/ 'at' and /kùb/ ~ /kúb/ 'only', are and remain free phonological words and assimilate their toneme to that of the last syllable of the preceding word.

9.5 SCOPE OF OCCURRENCE OF EXTERNAL SANDHI

Our knowledge of the *Teléfól* language is not yet sufficient for us to be able to predict the occurrence of external sandhi with any degree of confidence. All that can be done is to indicate a few trends and suggest some lines of further enquiry.

(a) Within a given class, do certain words undergo sandhi changes while others have no sandhi forms? Is such a distinction based on phonological factors or upon morphological sub-classes? So far as tone is concerned, it is pertinent to note that of the one-toneme words investigated,

all those with DOWN in isolation have sandhi forms, and all those with UP in isolation have no sandhi forms.

(b) Most of the words involved in sandhi changes have an isolation form as well as one or more sandhi forms, and this isolation form quite often occurs in connected speech. What are the syntactic and/or phonological conditions under which sandhi regularly occurs? The contrastive examples listed in 9.4(b) underline the importance of answering this question. It does appear that sandhi mostly occurs within syntactic phrases rather than between such phrases, for instance. Is sandhi ever optional, or ever related to speed of utterance?

10. ALTERNATIVE TONAL ANALYSIS

In sections 7 and 8 no attempt was made to state the allophonic composition of the two tonemes, UP and DOWN, nor that of final intoneme, since any such statements would be too lengthy and involved to give a simple picture of these tonemes. Instead, the pitch realizations of toneme sequences up to four were presented in Tables I-V. By following these tables it is possible to construct by analogy the pitch contours to be expected for words of five or more tonemes.

10.1 NATURE OF UP AND DOWN ANALYSIS

A careful examination of Tables I-V reveals several of the features of the two tonemes postulated for *Teléfól*:

(a) In all but utterance-final syllables, the essential nature of the UP and DOWN tonemes is neither pitch registers nor pitch contours (the two polar types postulated by Pike), but is rather a pitch step up or down to the next syllable.[11] In an utterance-final syllable UP is realized as a level or rising pitch and DOWN as a falling pitch. The fact that the phonetic evidence for a given toneme is to be found in the phonetic nature of the following toneme is not as strange as it might seem at first. It is commonly acknowledged in acoustic phonetics that voiceless stops, for instance, are recognized by the transition phenomena in contiguous vowels.[12]

(b) The first, sometimes the second, and the last tonemes of a word are considerably affected in their phonetic details by the tonal nature of the preceding and following words, and especially by a preceding or following final intoneme. One consequence of this is that the UP and DOWN tonemes have almost the same allophones, but with different distributions. These two tonemes do not actually overlap

(in the classical sense) because in each context they have allophones which are contrastive. Every pitch contour can be uniquely equated to a sequence of these tonemes.

(c) Elaborating further on (b), the phonetic pitch of the first (and sometimes the second) toneme of a word is affected by the final toneme of the preceding word. This is not sandhi but allophonic conditioning by the preceding toneme. This conditioning of allotones across an external juncture is similar to but less extensive than the conditioning that pertains between tonemes within a word. Whereas this feature is true of the contours presented in Tables I and II, those presented in Table V show no such conditioning across an internal juncture. This apparent inconsistency needs more investigation. For our present purposes it is assumed that the conditioning seen in Tables I and II is the norm and that the lack of conditioning seen in Table V is a rarer variant phenomenon (in either the informant or the investigator) that appeared under the circumstances of focussing attention on internal junctures.

10.2 ALTERNATIVE PITCH REGISTER ANALYSIS

It is possible to analyse the pitch data included in Tables I-IV in terms of two register tonemes, HIGH /ˊ/ and LOW /ˋ/. Under this analysis each word, in its basic form, has the same number of tonemes as it would under the UP and DOWN analysis, but the first vowel is toneless, and after the last syllable there is an extra floating toneme. For a given word, each UP is changed to a HIGH and each DOWN is changed to a LOW, and each new toneme is moved one place to the right. Thus CV́CV̀CV́C under the pitch step analysis becomes CVCV́CV̀C ˊ under the pitch register analysis. The floating toneme at the end of the word attaches itself to the toneless first vowel of the next word. This corresponds to the across-juncture conditioning described in 10.1(c). It is the chief characteristic of the final intoneme that it causes the floating toneme to attach itself to the final syllable of the word to which it belongs morphologically, rather than to the first vowel of the following word, thus accounting for the pitch glides so common on utterance-final syllables. When preceded by a final intoneme, the toneless first vowel of a word has no available floating toneme to provide its pitch. In this situation, the pitch of the first vowel is determined by the first toneme immediately following the toneless vowel. It is mid pitch when followed by a LOW toneme and upper mid pitch when followed by a HIGH toneme. The toneless nature of the first vowel may be

historically related to the extreme shortness and quality neutralization observed in the first vowel. (See 2.2 and 6.2.)

One way to test the descriptive efficiency of this pitch register analysis is to re-formulate the external sandhi rules of 9.4 in terms of HIGH and LOW. The result is virtually identical to that in 9.4 apart from the substitution of HIGH for UP and LOW for DOWN. Thus it seems that in their effect on the description of sandhi the pitch step and pitch register analyses are fully equivalent. Also, apart from being located one position to the right, the distribution of HIGH and LOW is similar to that of UP and DOWN. In fact, there seems to be no difference between the two analyses on the grounds of simplicity. On the subjective grounds that the author considers step tonemes carried by each syllable of a morpheme or word more elegant than register tonemes which leave the basic form of a word with one toneless syllable and one floating toneme, the former analysis has been preferred in the present paper. Of course, both analyses are rather unusual, because the pitch phenomena they describe are somewhat atypical.

11. ORTHOGRAPHY

It is the author's belief that the matter of orthography is a legitimate part of linguistics, despite the educational, social, and political factors involved in it. Furthermore, though phonological analyses that bear little similarity to orthographies (such as the "prosodic" and "generative" types) are quite legitimate avenues of investigation, no linguist ought to consider his study of the phonology of an undocumented language complete until he has dealt with the matter of a practicable orthography for lay use.

11.1 CURRENT ORTHOGRAPHY

As mentioned in 4.2 Rev. G.J. McArthur of the Australian Baptist Missionary Society made a tentative phonemic analysis of *Telefol* and established an orthography which has been used by the Mission to this day. The literature in this orthography consists of about 200 pages (6½ in. by 8 in.), duplicated in about 100 copies, consisting mainly of Bible stories and doctrinal material.

The chief features of this orthography are:

(a) It does not indicate vowel length or tone. (In a private communication Rev. McArthur mentions that he recognized the existence of tone and/or length contrasts in

the language but did not complete their analysis before leaving the Telefomin area.)

(b) Some of the specific instances of juncture discussed in section 8 are transcribed as separate words, but the majority are written as suffixes. A few are transcribed both ways.

(c) The transcription of voiceless, centralized, or missing vowels of initial syllables is the same in almost every instance to that employed in the present phonemic analysis.

(d) The digraphs **kw** and **ng** are used for /k^w/ and /ŋ/.

(e) As described in 4.2, **g** is written for intervocalic /k/ and /kd/ and for /d/ following /ŋ/, and **k** is written for /kk/.

(f) As described in 4.3, intervocalic **w** is written following /o/ and /u/, where the present analysis posits /b/.

11.2 RECOMMENDATIONS

It is recommended that the phoneme symbols used throughout this paper be used in the orthography for *Teléfól* with the following modifications:

(a) DOWN toneme be left unmarked except in contracted syllables, where (ˆ) and (ˇ) should tentatively be retained.

(b) Digraphs **kw** and **ng** should be used for /k^w/ and /ŋ/.

(c) Apostrophe should be tentatively used for internal juncture /#/.

(d) In final syllables /e/ and /o/ do not occur, but only /ee/ and /oo/. As there is no length contrast involved, and as these long vowels carry only one toneme in the final syllable, final-syllable /ee/ and /oo/ should be written **e** and **o** in the orthography. A summary of the occurrence of vowels in orthographic terms may be of value:

monosyllables	**a**	**i**	**u**	**-**	**-**	**aa**	**ii**	**uu**	**ee**	**oo**
initial syllables	**a**	**i**	**u**	**e**	**o**	**aa**	**ii**	**uu**	**ee**	**oo**
medial syllables	**a**	**i**	**u**	**e**	**o**	**-**	**-**	**-**	**-**	**-**
final syllables	**a**	**i**	**u**	**e**	**o**	**aa**	**ii**	**uu**	**-**	**-**

(e) External consonantal and vocalic sandhi should not be written since (i) it tends not to occur in speech as slow as that used by *Teléfólmiín* learning to read, and (ii) there seem to be enough regularities in its occurrence to expect that further study will reveal a good measure of predictability.

(f) External tonal sandhi, being contrastive, should be written. However, rather than using the phonemic transcription of 9.4 (compounding for monosyllables and tone change for longer words), it is recommended that words be written in their isolation tonal form and that a hyphen be written between words wherever unpredictable external tonal sandhi operates. Certain function words (e.g. /nòò/ ~ /nóò/) seem only to have sandhi forms and these probably need no hyphen.

11.3 EVIDENCE FROM LOAN WORDS

One of the goals in setting up an orthography is that, in its choice of phoneme symbols, the orthography should conform as much as possible to the usage of the national or trade language. One way of checking on this is to examine loan words to see the way in which vernacular speakers equate the phonologies of the national language and the vernacular. The only instance in which such a check seems necessary for *Teléfól* is in the matter of tone as compared with English unwritten accent.

English and Neo-Melanesian monosyllables of the pattern CVC are usually accepted into *Teléfól* in the otherwise rare form CV̀V̀C. For example, English **tin**, Neo-Melanesian **tin**, *Teléfól* /tíìn/ **tíin**. This tonal sequence corresponds to a pitch pattern that is falling, and is very similar to an Australian English citation intonation.

Of longer English words with accent on the first syllable that have entered *Teléfól* (usually via Neo-Melanesian), about two-thirds have one or two UP tonemes on the first syllable, and DOWN tonemes on succeeding syllables. For instance, Eng. **master**, Tel. /máàstà/ **máasta**; Eng. **pawpaw**, Tel. /fóófoò/ **fóófo**; Eng. **cabbage**, Tel. /kàábììs/ **kaábiis**. Despite the fact that the actual tonal equivalents assigned to English accent in loan words are rather varied, by choosing to mark UP and not mark DOWN in the orthography we have the diacritic mark on the same syllable as the English accent in the majority of these words.

NOTES

1. The phonemes of *Teléfól* are: /b/, /d/, /f/, /k/, /k^{w}/, /l/, /m/, /n/, /ŋ/, /s/, /t/, /w/, /y/, /a/, /e/, /i/, /o/, /u/, UP toneme /ˊ/, DOWN toneme /ˋ/, final intoneme /./, and juncture.

2. For another language with two wide-range tonemes see: Eva Sivertsen, Pitch Problems in Kiowa, *International Journal of American Linguistics*, 22.117-130 (1956).

3. Two previous papers have given the language name as *Teleéfoól*. This reflects an earlier stage of the phonemic analysis which recognized more long vowels than does the present analysis. The two papers are: Alan Healey, Linguistic Aspects of Telefomin Kinship Terminology, *Anthropological Linguistics*, Vol. 4, No. 7, pp. 14-28 (Oct. 1962); Phyllis Healey, Teleefool Quotative Clauses, in: Papers in New Guinea Linguistics No. 1, *Linguistic Circle of Canberra Publications, Series A, Occasional Papers No. 3*, Canberra, 1964.

4. A brief sketch of verb morphology is appropriate here. (a) Each verb has at least two stems, one marked for punctiliar aspect and another for continuative aspect. These stems may differ in various ways, but usually it is possible to identify within them a verb root and an aspect suffix. Some verb stems also contain an obligatory object prefix. (b) Dependent versus independent and open versus closed are two separate but similar dichotomies tentatively applied to verb forms. These dichotomies correlate with syntactic features of multi-clause sentences and are not unlike the concept of subordinate clause versus main clause. All dependent verbs are open; all independent verbs have closed forms and some independent verbs also have open forms which differ from the corresponding closed forms by the tonemes on the last two syllables. (c) A dependent verb consists of a verb stem plus various suffixes of either of two types - homopersonal and heteropersonal - which predict that the subject of the next clause is either the same as or different from that of this verb. (d) Some independent verbs consist of a verb stem plus a single suffix, such as those denoting customary action, negative reply and unfulfilled obligation. However most independent verbs consist of a verb stem plus three orders of suffix, the first order indicating "tense", the optional second order indicating negative, and the third order indicating subject-person.

5. Usually, in citing meaningful forms, juncture phonemes which commence or terminate the form are not marked, and juncture phonemes within the citation are represented by a space (see examples in 9.4). However, any juncture phoneme which does not correspond also to the boundary of a "grammatical word" is represented by #. Suffixes are cited with an initial hyphen to indicate the lack of juncture phoneme at that point.

6. The phonetic nature of final intoneme /./ may be defined in terns of its effect on the pitch of the final syllable of an utterance as shown in Tables I and II. No other intoneme has yet been identified with certainty.

7. Monosyllables share the characteristics of both initial and final syllables of longer words. Their initial and final consonants have the same possibilities (see 3.1) and similar frequencies (see 3.3) as for longer words. They have the same vowel possibilities (see 5.1) and similar vowel and gemination frequencies (see 5.3 and 1.3) as for final syllables. They have the same tonal possibilities (see 7.5) as initial syllables.

8. Morris Swadesh, The Phonemic Interpretation of Long Consonants, *Language* 13.1-10 (1937); Kenneth L. Pike, Phonemics, Ann Arbor, University of Michigan Press, 1947, p. 138; Charles F. Hockett, Short and Long Syllable Nuclei, *International Journal of American Linguistics* 19.165-171 (1953).

9. The term juncture as used here refers to what is often called "open juncture", and lack of juncture corresponds to what is often called "close juncture".

10. This juncture stability is perhaps limited to morphemes of the major classes. For function words and affixes it may be better to say that the occurrence of juncture at their boundaries is a characteristic of the individual grammatically determined allomorph (e.g. Table VI).

11. Kenneth L. Pike, Tone Languages, Ann Arbor, University of Michigan Press, 1948, pp. 5-13.

12. For instance see: Charles F. Hockett, A Manual of Phonology, *Indiana University Publications in Anthropology and Linguistics*, Memoir 11 of *International Journal of American Linguistics*, 1955, p. 207.

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PRECIS

A group of at least languages located around the Irian Bárat – Territory of New Guinea – Papua borders is here examined and it is demonstrated that they constitute a single linguistic family. This volume is mainly descriptive and the conclusions and theoretical implications are discussed within each chapter rather than at the end of the thesis.

Chapter I describes the methods employed in collecting the linguistic data on which this study is based. The problems peculiar to linguistic surveys are discussed as well as those that arise when the linguist and informant have no language in common. Pair testing has been found to be a very helpful device for studying the sound system of a language, and a tape-recorder has proved to be a very versatile tool in field work (provided one doesn't become its slave). An extensive bibliography on field method is added.

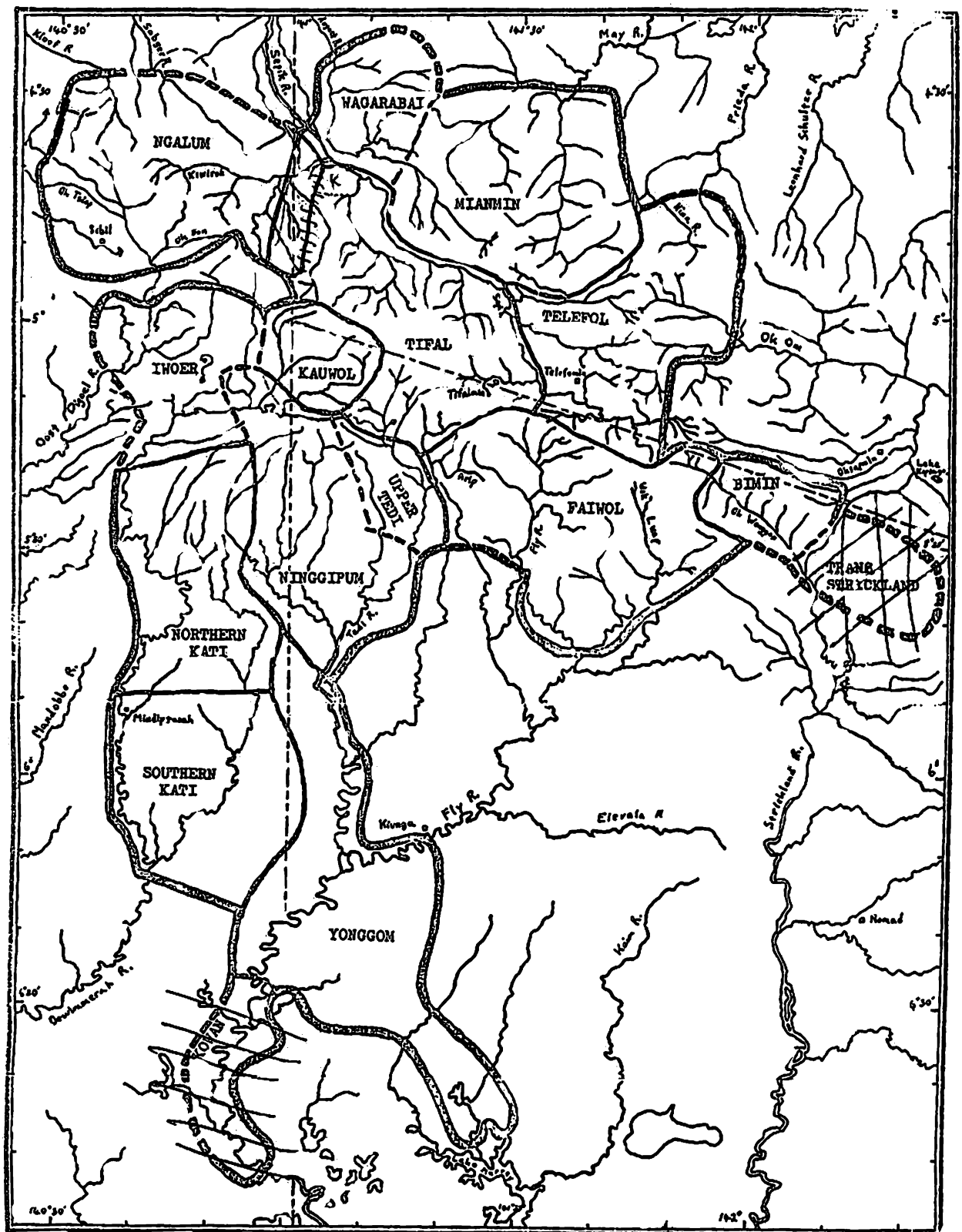
Chapter II describes and compares the OK Family of languages. The name, location and population of each language is presented within the framework of a tentative classification into two sub-families, Mountain – Ok and Lowland – Ok. An alternative classification into three is possible and is actually preferred later (Chapter III, Conclusion). The Ok languages very simple phonemic systems based on a maximum of 14 consonants and 7 vowels. All Mountain – Ok have lexical pitch. Closed syllables predominate in most languages. On the whole, nouns are not inflected but verbs are suffixed for subject person/number, tense and aspect, and some verbs are prefixed for object person/number. Pronouns distinguish I you m. you. F he she we you pl. they whereas subject suffixes on verbs distinguish I you he she we you pl./th.

A few types of phrase and clauses are described. Lexicostatistical word lists, scorings and percentages are presented and these agree well with the language classification adopted and at the same time indicate two cases of probable borrowing. Other language families neighbouring the Ok Family are examined and their contrast with it demonstrated.

Chapter III identifies sound correspondences within Mountain – Ok and within Lowland – Ok, and lists of tentative proto – forms are listed to illustrate these correspondences. The considerable amount of regularity observed indicates that the comparative method is just as applicable to these New Guinea languages as to Indo – European or Austronesian languages. Some preliminary Proto – Ok cognate sets are offered and some doublets that may point to Archaic Ok are discussed.

Chapter IV illustrates Mountain – Ok phonologies with that of Teléfól. A method of scanning tape – recorded data is employed to measure the length of phonetic segments, and by this technique vowel length is shown to be neutralized in medial syllables. Vowel distribution and neutralization is examined in detail. Lexical pitch is analyzed in terms of two step tonemes, UP and DOWN. Juncture and Sandhi are also discussed.

THE LANGUAGES OF THE OK FAMILY



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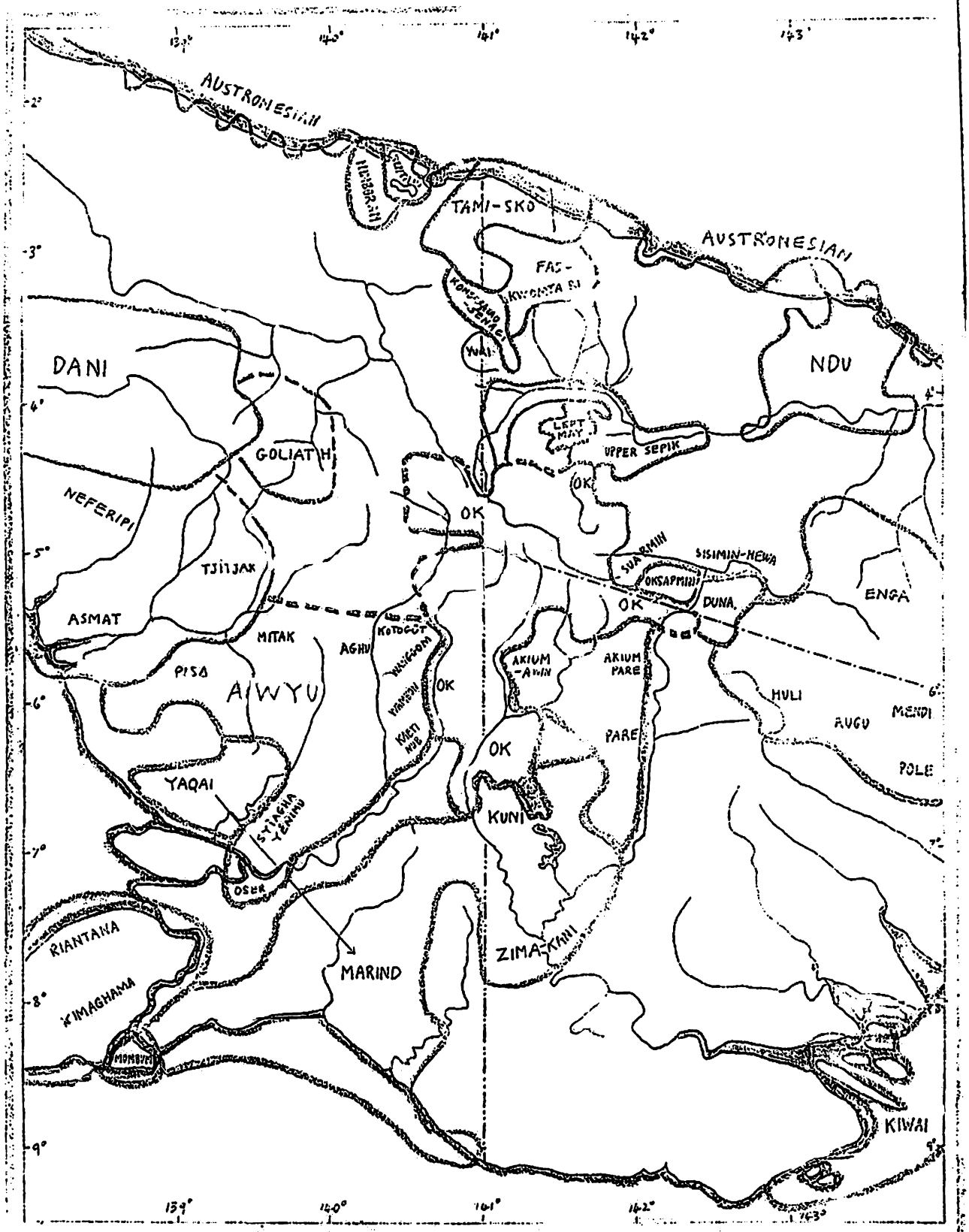

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