The numeral system of Proto-Niger-Congo

A step-by-step reconstruction

Konstantin Pozdniakov

language
science
press

Series information: ./langsci/seriesinfo/nc-info.tex not found!

The numeral system of Proto-Niger-Congo

A step-by-step reconstruction

Konstantin Pozdniakov

Konstantin Pozdniakov. 2018. *The numeral system of Proto-Niger-Congo*: *A step-by-step reconstruction* (Niger-Congo Comparative Studies 2). Berlin: Language Science Press.

Ирине Поздняковой

Contents

Preface

1 Introduction

1.1 Niger-Congo: the state of research and the prospects for reconstruction

It is quite predictable that the title of this book may be met with skepticism by specialists in the comparative-historical studies of African languages. The first question that may arise is whether a Niger-Congo (NC) reconstruction is achievable at all, considered that the reconstruction of proto-languages underlying particular families and their branches has not been completed (or even properly started, as is the case for some groups and branches of NC). Before we turn to the structure of the book, let us try to answer this fundamental question. To do so, it seems reasonable to very briefly outline the present state of affairs in NC comparative studies.

First, it should be noted that presently there is no general scientific discipline such as "NC comparative studies". Instead, there are individual researchers who work on particular families, groups, sub-groups or branches of NC. Among these, comparative-historical Bantu studies has flourished the most. However, the Bantu languages comprise only a branch of the Southern Bantoid languages that (together with Northern Bantoid) go back to Proto-Bantoid. Hence Bantu is merely one of 16-17 Bantoid branches, as can be gleaned from the chart below.

The progress of comparative-historical studies of the Bantoid languages has been less impressive than that of Bantu studies. Proto-Bantoid, as well as a number of other proto-languages, goes back to the Proto-Eastern-Benue-Congo. In turn, the latter (along with Proto-Western-Benue-Congo and possibly some other languages that do not belong to these two major groups of Benue-Congo) goes back to Proto-Benue-Congo (BC). Hence, the Bantoid branch is merely one of 14-15 branches of Benue-Congo, as demonstrated by the chart below (Table 2).

The traditional reconstruction of Proto-BC based on regular correspondences between the proto-languages underlying the separate branches listed in table 0.2 has developed rapidly in recent years. However (and I hope that my colleagues will take no offence at this statement), despite numerous brilliant studies dealing

Table 1: Bantoid languages
This book does not investigate the genealogical classification of Niger-Congo as a whole, nor of the individual families of this macro-family. The schemes presented here take into account the most well-known classifications (sometimes with small deviations due to the specific purposes of our study). The scheme of Bantoid languages given here is based mainly on the classification in https://mpi-lingweb.shh.mpg.de/numeral/Niger-Congo-Benue-Congo.htm . It generally reproduces the John Watters' classification (1989: 401) with some deviations, which are not considered here.

Northern Bantoid:	Dakoid	Mambiloid	Fam	Tiba (Fà)
Southern Bantoid:	**Bantu**	Beboid	Yemne-Kimbi	Ekoid
	Jarawan	Mamfe	Mbam	Mbe
	Ndemli	Tikar	Tivoid	Wide Grassfields

Table 2: Benue-Congo languages
Inventory of Benue-Congo groups is given mainly by **Williamson1989b**: 266-269. The main difference in Table 0.2 is that Jukunoid is separated from Platoid, which allows us to better compare the forms of numerals of these groups, as well as the fact that Lufu has been added to isolated languages. The division of the BC into the Western and Eastern branches does not always reflect the genealogical characteristics of languages.

*Western BC	*Eastern BC
Nupoid	Kainji
Defoid	Platoid
Edoid	Cross
Igboid	Jukunoid
Idomoid	**Bantoid**
Isolated BC: Oko, Akpes, Ikaan, Lufu	

with the subject, this is still a relatively 'young' science.

Finally, in addition to Proto-BC there are probably more than ten proto-languages underlying other language families that together comprise the Niger-Congo macro-family (see Table 3).

Table 3: Niger-Congo languages
The grouping of 12 families of NC into 5 geographical zones is convenient for technical purposes of generalization of data. So, it means nothing else. As for a genealogical tree of NC languages, as of today there are insufficient grounds for creating one, in my opinion.

		Dogon		Kordofan
Atlantic	Mande	Gur	Ubangi	Adamawa
Mel	Kru	Kwa	Ijo	BC

Most of the works presently available in NC comparative studies do not reach beyond this point. Exceptions are rare, and examples of the comparative-historical approach to the NC reconstruction are few. Moreover, the most significant works of this kind (e.g. those of **Westermann1927**, **Greenberg1966**, **Sebeok1971**, etc.) are not that recent and usually date to the middle of the 20th century. Comparative studies of the African macro-families had a jump start but nearly had come to little by the end of the 20th century (important works such as **Bendor-Samuel1989** including **Williamson1988**; **Williamson1989a** are few in this period).

So, what happened?

By the 1990s, our knowledge in the field of African languages had begun to grow exponentially. Hundreds of new language descriptions had been published, and the few dozen experts working in NC comparative linguistics were simply unable to digest this avalanche of new information.

The main problem in the 1960s was that we knew too little. From the 1980s on, we have faced the opposite problem: we know "too much". Not only do scholars not have enough time to absorb new results, sometimes they do not even have enough time to acquaint themselves with those results. During the last four decades, amidst this dialogue between linguistic knowledge and language data, African linguists have remained in listening mode. But I am convinced that the time has come for linguists to say something new again. Unlike even ten years ago, today we are well equipped to do so.

Firstly, we have really exceptional databases. The best one is the RefLex database elaborated by Guillaume Segerer (Segerer & Flavier). It contains more than one million words from African languages (2017), and each entry contains a link to a

PDF file of the corresponding source page. It provides a huge range of information and is maximally user-friendly to comparative linguists: it can be solicited for establishing regular phonetic correspondences, for reconstruction and for ranking reflexes as well as for various kinds of statistical data analysis. This new database is being constantly updated.

A big database is something much more than just a huge amount of data. When a database reaches certain degree of plenitude with respect to the main families and branches of the NC macro-family, it opens up prospects for both working with the distribution of words that do exist and with the distribution of **gaps** in postulated cognates. The distribution of filled cells and lacunes is a powerful tool allowing 1) identification of important innovations, 2) targeted searches for unusual phonetic reflexes, 3) detection of diachronic semantic changes and 4) refinement of genealogical classification.

In my opinion, the opportunity to rely on both the apparent cognates as well as on the missing reflexes of reconstructed prototypes in particular languages dramatically changes the approach to the reconstruction itself.

The following case may serve as an illustration to this statement. Suppose we need to assess one of Greenberg's proposals, e.g. a Niger-Congo root meaning 'hill'. Among the reflexes quoted by Greenberg for this root are: "(2) Busa *kpi* 'mountain', Kweni *kpi* ; (4) Gã *kpɔ* ; Gwa *ogba* 'mountain'; (5) Nungu *agbɔ*, Ninzam (Ninzo) *igbu*. Kordofanian: (2) Tagoi *(c)ibe*." (**Greenberg1966**). The phonetic correspondences underlying the comparison of these forms will not be discussed here (we will just assume that they are valid), for the main problem is elsewhere. A reader with no access to a representative lexical database on the NC languages is always uncertain about a number of key issues, including:

1. whether the root in question is widely attested in the families and groups for which the author postulates the reflexes?

2. whether the root is present in other NC families and groups and how widely it is attested in them?

3. are there any other roots possibly interpretable as NC terms for 'hill'?

The RefLex database establishes that:

1. there are plenty of forms phonetically similar to those of Greenberg (cf. e.g. Boko (in the same sub-group as Busa) *kpii* 'mountain', Gwari (Nupoid, BC) *ōpé* 'hill, mountain', etc), but the postulated root is at best only marginally attested in the families where Greenberg finds it.

2. The root is absent in other branches and families (even if the proposed phonetic correspondences are approached most liberally), although, if wished, its "reflexes" can be found in any of the NC families, cf. e.g. Ibani (Ijo) *kpókpó* 'hill', etc.

3. Most importantly, several other roots with the meaning 'hill, mountain' are distinguishable in the NC languages. All of them (unlike the one proposed by Greenberg) are valid candidates for the reconstruction of the NC prototype. One of these roots is presented in the chart below (0.4) (one could mention some other roots nearby):

Table 4: **tʊnd* 'hill, mountain' in Niger-Congo

		tɔ́rɔ́		
*tʊnd	*tinti, *ton			
tul- ?	tōḍō	tu?	tɔ́ndɔ́	tòndà

The exact correspondence between Proto-Bantu (**tòndaˋ*, zones HJKPMNRS > (?) **dóndὸ*, zones EGHJKLMNRS), Ijo (Ibani *tóndŏ*) and Atlantic languages (Atlantic Bak: Manjak *ntʊnda*, Atlantic North: Basari *e-tə́nd*, Bapen *ɛ-tʌnd*, Laala *tundə*, Fula *tulde*, Wolof *tund*) is reason enough to postulate the root **tʊnd* 'hill, mountain' at the Proto-NC level, especially since these languages have apparently been out of direct contact[1]. In addition, the absence of this root in Gur-Ubangi-Adamawa may prove to be a shared innovation in these languages.

Using the databases, the focus of our research could be redirected toward the basic meaning of the lexemes (rather than on the occasional phonetic similarities between the forms). This approach may help in answering the following question: if a Proto-NC term for 'mountain, hill' existed, how did it sound? The answer would probably be as follows: this word could sound like **tʊnd*, **kong/ keng* or **kudu* ('hill, rock, stone'), but not like *dima* (PB **dìmà*, zone EGJ), *mut* (Proto-Jukunoid **muT*) or *pi* (PB *pìdì*, zone KLMN).

Upon arriving at these unconventional "results", one could bring them to the attention of specialists in particular NC languages and branches for further eval-

---

[1]We shall repeat that nearby there are some other candidates for 'mountain' in NC, which we do not treat here.

uation. Without such professional evaluation there can be no hope for success. Moreover, in recent years it has become evident that this evaluation needs to be collaborative (i.e. made by dozens of specialists working together) for the simple reason that today no specialist can be proficient in the languages of more than one or a maximum of two NC families. Hence, it is important that these specialists are asked questions they can answer, so ideally the approach outlined above should be applied to every family within Niger-Congo. For example, according to the etymological database of the Atlantic languages (Pozdniakov-Segerer 3700 cognates, 2017) only *tʊnd* and *thəng* are potentially interpretable as the terms for 'hill, mountain' in Proto-Atlantic.

Initially I thought of numerals as of an ideal group of terms to test this approach. On the one hand, the core group of numerals must have existed in Niger-Congo. On the other hand, they represent a relatively compact lexical-semantic group with minimum potential for semantic shifts. My initial question seemed simple: what is the most probable Proto-Niger-Congo root for 'two'? The term for 'two' (being the only numeral on the Swadesh list) is generally recognized as one of the most persistent numerals. Why not try reconstructing it on the basis of the NC evidence? It appeared, however, that such a reconstruction is beset with difficulties, so what was originally intended as an article turned into this very book. The structure of the book is described in the section below. As I hope to demonstrate, this structure is conditioned by specific issues encountered in the course of the reconstruction of NC numerals.

Sources and the monograph structure

Sources

Numeral terms included in the majority of lexical sources hold a privileged position. The information pertaining to the Niger-Congo numerals is more than extensive, it is nearly exhaustive. In addition to the above-mentioned RefLex database by Segerer-Flavier which contains over 17,000 entries marked as "numeral" (state April 2017)) a number of other databases with expansive coverage of the Niger-Congo languages are available. One of them is the "Numeral Systems of the World's Languages" database created by Eugene S. L. Chan and edited by Bernard Comrie (Chan) The data regarding the number systems of about 4,300 languages (with hundreds of the Niger-Congo languages among them) is incorporated into it. Two or even three sources (often unique) are accessible for some of the languages via this neatly organized and user-friendly database. Another

universal database that provides numerical data is "Numerals 1 to 10 in over 5000 languages" by Rosenfelder. It was consulted to a somewhat lesser extent because it only includes evidence pertaining to the first ten numerals, for which a simplified transcription is used. Finally, a number of unpublished databases that incorporate the evidence of specific Niger-Congo families and groups were consulted, e.g. the etymological databases of Atlantic (Pozdniakov-Segerer) and Mande (Valentin Vydrin).

As a result, a total of 2,200 sources for Niger-Congo languages were used in this study. This raises the issue of references, since it is impossible to provide a complete list of sources for every NC language. The language index at the end of this book lists the nearly 1,000 languages cited. For these 1,000 languages, the main sources I used are indicated in Appendix 5. The index of sources in Appendix 5 is structured according to the NC main families in alphabetical order.

For each language, I provide not only the source(s) that can be found in the bibliography, but also the name of every contributor in Chan's database [Chan]. The list of contributors is many pages long, but their names should be known, even if their data are unpublished. This is the least I can do to express my sincere gratitude to each of them.

Monograph structure

Noun class affixes are present in numerical terms in the majority of the Niger-Congo languages. At the same time, many forms that are considered primary at the synchronic level have frozen noun class affixes that are no longer productive. In such cases it is extremely difficult to distinguish the etymological root within a numerical term. Without it, however, both the comparison and reconstruction of roots is impossible. This is why the first chapter of this book is devoted to the study of various uses of noun class markers in numeral terms.

The second chapter deals with the alignment by analogy in numeral systems. As in other languages, numerals represent a lexical-semantic group that is especially subject to alignment by analogy due to its closed structure, where words are associated in a paradigm. A textbook example is the term for 'nine', with Indo-European ***n**- irregularly reflected in Proto-Balto-Slavic as **d**- (Russian *dev'at'* '9' instead of the expected **nev'at'*) by analogy with the term for 'ten' (Russian *des'at'* '10'). This yielded a minimum pair *dev'at'* ~ *des'at'* that forms a "class of the upper numerals" within the first ten. Adjacent numerals may be alined with each other in the NC languages by a similar formal marker. Thus, no satisfactory etymology can be suggested for the forms attested in Mumuye (Adamawa; *ziti* '2' ~ *ta:ti* '3' ~ *dɛ̃:tì* '4') without the analysis of alignment by analogy. The issues

pertaining to both detection and analysis of such alignments are addressed in Chapter 2.

Chapter 3 offers a step-by-step reconstruction of number systems of the proto-languages underlying each of the twelve major NC families, on the basis of the step-by-step-reconstruction of numerals within each family. The term "reconstruction" related to numerals throughout this book calls for a definition. As mentioned above, the use of this term has been questioned, mainly because systems of regular phonetic correspondences between the languages within NC families remain unknown. This is why Kay Williamson opted for the term *pseudo-reconstructions* (marked with # instead of *): "Reconstructions proposed by their authors as based on regular sound correspondences are preceded by an asterisk. Pseudo-reconstructions based on a quick inspection of a cognate set without working out sound correspondences are proceded by a #" (**Williamson1989b**). In his numerous online publications Roger Blench uses # as well, but his terminology is different: he prefers the more neutral term of *quasi-reconstructions*. Modern comparative studies of the NC languages is a relatively young science, so the opposition between "real" and "pseudo-/quasi-" reconstructions seems irrelevant to me at this stage. The more so that nearly all of our reconstructions (maybe with the exception of Bantu and some other branches) should be marked with #, including the large proportion of reconstructions allegedly based on the evidence of historical phonetics. On the other hand, I think that many colleagues would agree with the following statement: although we do not know the regular phonetic correspondences between the languages that belong to different NC families, there is hardly any doubt that the NC root for 'three' sounded something like *tat*.

Throughout this book the term "step-by-step reconstruction of number systems" (e.g in the Atlantic family) is used in reference to the method that includes the following steps:

1. While comparing the forms of numerical terms attested in the languages under study, their most likely prototypes were established within both of the Atlantic groups, i.e. Northern (Proto-Tenda, Proto-Jaad-Biafada, Proto-Fula-Sereer, Proto-Wolof, Proto-Cangin, Proto-Nalu-Baga Fore-Baga Mboteni) and Bak (Proto-Joola-Bayot, Proto-Manjak-Mankanya-Pepel, Proto-Balant, Proto-Bijogo).

2. On the basis of these prototypes, the most likely forms of Proto-Northern Atlantic and Proto-Bak Atlantic numerals were suggested.

3. On the basis of these more ancient forms, the most plausible reconstruction of Proto-Atlantic numerals was offered.

Chapter 4 deals with the reconstruction of the Proto-Niger-Congo numeral system on the basis of the step-by-step-reconstructions offered in Chapter 3 for each of the twelve major families and a handful of isolates. The reconstruction described in Chapter 4 inspired the analysis of the distribution of reflexes of the NC proto-forms within each of the twelve families (as well as within the isolates) in order to establish:

1) the most archaic NC families / groups / branches (i.e. those that preserve the inventory of Proto-NC forms most fully);

2) NC families / groups / branches that are the most distant from Proto-Niger-Congo in what pertains to the reflection of numerals.

The results of this analysis are presented in Chapter 5.

To illustrate the logic of the complex structure of the monograph, let us consider one example.

In Chapter 3, along with other NC families, the numerals of the Atlantic languages are analyzed (section 3.12). Atlantic languages are divided into two main groups – North Atlantic (section 3.12.1) and Bak Atlantic (section 3.12.2).

In Sections 3.12.1.1.–3.12.1.7, systems of numerals are considered consecutively in the seven main subgroups of the North Atlantic languages. In particular, in §**??**, numerals in the Jaad-Biafada subgroup are considered and it is established that in these languages, for the numeral '10', the form *-po* is attested. In the final section of 3.12.1, namely in §**??** the forms of numerals in the seven northern subgroups are compared, and in particular it is concluded that for Proto-Northern Atlantic, the most probable reconstruction for the numeral '10' is the reconstruction of **pok*.

In Sections 3.12.2.1-3.12.2.4, the numeral systems in each of the four subgroups of the second Atlantic group, namely Bak, are discussed consecutively. The final section concerning the Bak group (3.12.2.5) concludes that the only candidate for reconstructing '10' in the Proto-Bak (in addition to the possible model 10 = 5 * 2) is the root **-taaj*.

In the final paragraph of section 3.12, namely in 3.12.3, the systems of the North Atlantic languages and the Bak Atlantic languages are compared. This paragraph concludes that the comparative evidence points to the total absence of common roots present in both groups. The only exception to this is the root **tɔk / *tVk* 'five'. Accordingly, it is concluded that it is impossible to reconstruct the Proto-Atlantic root for the numeral '10' without the Niger-Congo context.

In Chapter 4, reconstructions for each family are compared. Accordingly, Chapter 4 has a different structure. If in Chapter 3 each of the sections is devoted to a particular family of languages (in particular, §?? is devoted to the Atlantic languages), then in Chapter 4 each section is devoted to the prospects for the reconstruction of each Niger-Congo numeral. So, in §?? all intermediate reconstructions for the numeral '10' are considered. It turns out, in particular, that the form *-taaj* reconstructed for '10' in the Proto-Bak does not find parallels in other Niger-Congo branches. In contrast, the root *pok* '10', reconstructed for the North Atlantic languages, can be related to the roots reconstructed for the vast majority of Niger-Congo families (it seems to be missing only in Ijo, Dogon and Kordofanian). Based on the NC comparison, the root for '10' is reconstructed as *pu* / *fu*.

Chapter 5 traces the history of the numerals of Niger-Congo, reconstructed in Chapter 4, in each individual family of languages. Accordingly, each section, as in Chapter 3, is devoted to one of the NC families. So, §?? is devoted to the Atlantic languages. In particular, it is concluded that in the North Atlantic languages the term for '10' has been preserved in three sub-groups (Wolof *fukk*, Proto-Tenda *pəxw*, Proto-Jaad-Biafada *po*). In the other subgroups it is replaced with isolated innovations. The forms of the Bak languages are also innovated.

So, the basic logic of the chosen structure of the book is as follows: we will consistently move from reconstructions in individual families (Chapter 3) to the reconstruction of each Niger-Congo numeral (Chapter 4) and to the interpretation of each individual family in the Niger-Congo context (Chapter 5). We will take into account the provisions formulated in the preliminary chapters concerning noun classes in numerals (Chapter 1) and changes by analogy in systems of numerals (Chapter 2).

Acknowledgments

Abbreviations

Language groups and proto-languages:
BC – Benue-Congo
GD – Ga-Dangme
GTM – Ghana–Togo Mountain
Juk. – Jukunoid
NC – Niger-Congo languages
PB – Proto-Bantu
PLC – Proto-Lower Cross
PP – Proto-Platoid
PTB – Proto-Potou-Tano-Bantu
PUC – Proto-Upper Cross
SE – South-Eastern Mande
SWM – South-Western Mande
Others:
CL – noun class
CL.SG. – noun class of singular
CL.PL. –noun class of plural
CM – noun class marker
dial. – dialect
PL. – plural
redupl. – reduplicated
SG. – singular.

0.1 Kwa

More than eighty Kwa sources were used for the reconstruction. They are representative of the major groups and sub-groups of this family, which consists of about seventy languages. A plausible internal classification of the Kwa languages does not exist. A step-by-step reconstruction of numerals may well be viewed as another important step in this direction. Our preliminary survey of the pertinent evidence is based on the traditional classification that distinguishes five major Kwa branches. We will start with the study of the numerical terms by branch. Then, individual reconstructions will be evaluated with regard to their potential for the general reconstruction of the Proto-Kwa numeral system.

0.1.1 Ga-Dangme

Table 0.1: Ga-Dangme numerals

	Dangme	Ga	Dangme	Ga
1	kákē	é-kòmé	7 kpà-à-gō (6+1)?	kpà-wo (6+1?)
2	é-ɲɔ̃̀	é-ɲɔ̀	8 kpà-a-ɲɔ̃̄ (6+2)	kpà-a-ɲɔ̃ (6+2?)
3	é-tɛ̃̄	é-tɛ̃	9 nɛ̃̀ɛ̃́	nɛ̀ɛhṹ
4	é-ywὲ/é-wìὲ	é-ɟwὲ	10 ɲɔ̃̀ŋmá (PL: ɲìŋmí)	ɲɔ̀ŋmá
5	é-nũ̃ɔ̃̄	é-nùmɔ̃	20 ɲìŋmí éɲɔ̃̀ (10*2)	ɲɔ̀ŋmá -í éɲɔ̀ (10*2)
6	é-kpà	é-k͡pàa	100 làfá	ò-há, pl. -ì
			1000 à-kpé	à-kpé, pl.-ì

These two languages exhibit isolated forms of the term for 'one'. Both terms will be preserved for further comparison (note that the first syllable of the Dangme term probably represents a noun class prefix). The term for 'eight' is undoubtedly constructed as '6+2'. The term for 'six' is primary, hence the term for 'seven' must be formed of '6+1'. This would suggest the existence of an additional term for 'one' (*-gō/-wo). Two separate forms are attested for 'hundred'. Apart from that, the Dangme and Ga numeral systems are quite homogeneous.

The Adampe system is in many respects different, so there may be doubts as to whether it indeed belongs together with Dangme. The Adampe evidence will be treated later in this chapter.

0.1.2 Gbe

The reconstruction of the Proto-Gbe numeral system is straightforward, since alternative forms are few (Table 0.2). It is based on the available evidence from twelve of the Gbe dialects.

Table 0.2: Proto-Gbe numerals and patterns (*)

1	è-ɖe/ɖe-kpo	7	'hand'+2, 5+2
2	è-ve/e-wè	8	e-ɲí, 'hand'+3
3	è-tɔ̃	9	8+1, 5+4
4	è-nὲ	10	e-wó, *bula
5	à-tɔ́ɔ̃	20	10*2, ko
6	à-ɖɛ́/zɛ́	40	e-kà
100	40*2+20	1000	à-kpé, kotokũ

The Gbe term for 'six' is primary. Its form, however, differs significantly from the (also primary) one attested in the languages of the Ga-Dangme group.

The term for 'eight' seems to be derived from 'four', whereas the term for 'nine' follows the pattern '8+1'.

The forms for 'twenty' follow the pattern 'X*2' in Aja (*bulaa-ve*), Waci-Gbe (*blá-ve*) and Ewe (*blá-vè*), which suggests an alternative form for 'ten' (**bula*).

The etymological relationship between the term for 'fifteen' and a lexical root with the meaning 'foot' attested in two of the dialects is an apparent innovation: Maxi-Gbe *à-fɔ̃-tɔ́* ('foot', '3') and Kotafon-Gbe *fɔ́-tɔ̃* ('foot','3'). This pattern is attested in a number of the NC languages (including Atlantic).

A primary term for 'forty' is distinguishable (hence '50=40+10', '60=40+20', '70=40+30', '80=40*2', '90=40*2+10').

0.1.3 Ka-Togo

Ka-Togo is a quite diverse group of the Left Bank languages. The reconstructions for each of its three branches are provided in the table below (Table 0.3). Its rightmost column lists forms and patterns that are the most likely candidates for the Proto-Ka-Togo reconstruction.

Table 0.3: Proto-Ka-Togo numeral system (**)

	*Avatime-Nyangbo	*Kebu-Animere	*Ikposo-Ahlo-Bowili	**Proto-Ka-Togo
1	o-le	ʈɛ́-ì, bɛ-ɹi	ɛ̀-dɪ/ɛ̀-dɪ-gbo	**di**
2	ɛ-bha	din/ji	ɛ̀-va /ɛ̀-fwa	**bha, din**
3	ɛ-ta	tha	ɛ̀-ta/ɛ̀-la	**ta**
4	ɛ-nɛ́	nie	ɛ̀-na	**na/nɛ**
5	ɛ-tí, ɛ-cu	thu(ŋ)	ɛ̀-tɔ	**tu(N)**
6	golo/holo	kòrɛ̃̀ŋ	ɛ̀-gɔlu/ɛ̀-wɔlu	**golo/ koro**
7	6+1	10-3	6+1, kɔ̀nɔ̀, ù-zòni	**6+1**
8	10-2? a-nsɛ	4*2	ɛ̀-lɛ?,<4	**4*2, nsɛ/lɛ?**
9	10-1? zi+3?	5+4?	8+1, 10-1?	**8+1? 10-1**
10	kɛ-fɔ	the	wa/wu, i-jo, *bula	**fo/wo, te, bula**
20	10*2	10*2?	bula-2, lye-2, ŋué-2, tɛ́ɛ́yá?	**10*2**
100	a-lafa (< Ewe)	tùùrù, sala	gbɔwa	**lafa?**
1000	a-kpe (< Ewe?)	lààfā	a-kpe	**a-kpe**

It needs to be stressed that the forms marked with /**/are only suggestive and should not be taken at face value. They are not reconstructions in the strict sense and only serve for comparative purposes, so the absence of a tonal marker in a reconstructed form should not be considered meaningful. It only shows that at this point the available evidence does not allow reconstructing a tone in the pertinent case.

0.1.4 Na-Togo

An overview of numerical terms as attested in the branches of Na-Togo and some isolated languages is provided below (Table 0.4). A tentative reconstruction of the Na-Togo numeral system can be found in the rightmost column.

Table 0.4: Proto-Na-Togo numeral system (**)

	Adele	Anii	*Lelemi	*Likpe-Santrokofi	Logba	**Proto-Na-Togo
1	è-kí	dǐŋ, *mi	ù-nwi/ɔ̀-wɛ̃́	nɔ̀ɛ́/nwîì (lὲwέ)	i-kpɛ	**i-wɛ/kpɛ? , di(N)?**
2	è-nyɔ̀ɔ̀n	ī-ɲīȭ	í-ɲɔ́	ɲɔ́/núɔ̀	i-nyɔ	**i-nyɔ**
3	à-sì	ī-rīū	è-tɛ	tiɛ́	i-ta	**i-ta**
4	è-nàà	ī-nāŋ	í-na	na	i-na	**i-na**
5	tòn	ī-nȭŋ	è-lɔ	nɔ́	i-nú	**i-no(N)**
6	kòòròn	ī-kōlōŋ	è-ku	kua	i-gló	**golo/kolo, ku**
7	6 + 1	kūlūmī (6+1?)	4+3?	6+1?	6+1	**6+1**
8	nìyὲ	4PL	4PL?	4PL?	4PL	**4PL**
9	yὲ-1	tʃīīnī	10-1	nase	X-1	**10-1**
10	fò	tɘ̄b	vu/we	fo/wo?	u-ɖú	**fo, ɗu, tɘb**
20			10*2	10*2		**10*2, ɔ-ɖɔ(n), ā-kōō, dìkpìlìn**
50	20*2+10	20-PL+10	ti	10*5	10*5	**20*2+10**
100	20*5	20*5, gā-sɘ̄wā	50*2, lafa	kò-lòfá	u-ga	**20*5, lofa, u-ga**
1000	200*5	ū-fɘ̄lɘ̄, kōtōkū	pim, ka-kpi	kɔ̀-kpí	a-kpi	**a-kpi, pim?**

The Lelemi term for 'fifty' (*lì-tì*) is peculiar because it is a likely source of 'hundred': *è-tì á-ɲɔ́* ('50*2').

0.1.5 Nyo

The Nyo group, which is comprised of dozens of languages, is the most representative within the family. For this reason (even though the Nyo numeral systems are closely related to each other) they will be studied separately (by sub-group) and then compared to each other.

0.1.5.1 Agneby (Abbey, Abiji, Adioukru)

Alternative sources representative of these three languages are quoted below (Table 0.5). Significant variation of forms is sporadically attested.

Table 0.5: Proto-Agneby numeral system (*)

	Abbey1	Abbey2	Abiji1	Abiji2	Adioukru1	Adioukru2	*Proto-Agneby
1	ŋ̀kpɔ̄	ŋ̀kpɔ̄	ń ˈnɔ́	ńnɔ̀	ɲâm	ɲâm	N-kpɔ, ɲ-âm, *a-ri
2	āɲɔ́	āɲʊ̆́	áá ˈnʊ̆́	áānʊ̄	yóɲ	ɲóɲ	a-ɲʊ/nʊ̄
3	ārí	ārí	ɛ̆́ɛ̆́ ˈtɪ̆́	ɛ̆́ɛ̆́tī	ɲâhɲ̀	ɲâhɲ̀	a-ti(N)/ ri
4	ālɛ́	àlɛ́	ắắ ˈlắ	ắắlā	yâr	jâr	a-ní/la, jar
5	ōnɪ́	ōní	ɛ̆́ɛ̆́ ˈnɛ̆́	éēnē	yên	jên	o-ne,lɔ̀hʊ̀̃, jên
6	lɔ̀hʊ̀̃	lɔ̀hɔ̆̃	náhʊ̀ã̀	náhʊ̆̃ã̆	nɔ̂hɲ̀	nɔ̂hɲ̀	hu(n)
7	lɔ̀hʊ̀̃-árī	lɔ̀hm̃ã̆rí	nɔ̃́bʊ̀	nɔ̃́ᵐbʊ̀	lɔ́bɲ̀	lɔ́bɲ̀	6+1, bu(n)
8	èpyè	èpʲè	nówò	nówò	níwɲ̀	níwɲ̀	è-pyè, wo(n)
9	ɲâkó	ɲāàkó	nɛ̃́ ˈbrɛ̆́	nɛ̃́ᵐbrɛ̀	líbárm̀	líbárm̀	bare(-n)
10	ènʒ̀	ǹnɛ̀	ńdíɔ̀	ńdíɔ̀	lêw	lêw	nɛ(n) (< 5PL?), diw/ liw
20	ēbrá-ɲʒ̀	òbrāɲɔ̆̀	àbrúáɪ̯́	àbrŭ̃áɪ̃̀́	líkɲ̀	líkɲ̀	<'hand' *2?,li-kŋ
100	yā	jā	yǎ	jǎ	ékɲ̀-yén	ékŋ jên (20*5)	ja, 20*5
1000	àkpī	àkpī		àkpǐ		fándí (Engl.?)	a-kpi

The presence of the primary terms for 'seven', 'eight' and 'nine' is an important

characteristic of this sub-group.

0.1.5.2 Attié

Internal reconstruction of the Attié numeral system yielded the following results (Table 0.6):

Table 0.6: Attié numeral system (*)

1	kə(n)	7	nson
2	mwə(n)	8	ma-4? 2 de 10?
3	ha(n)	9	ŋgwan
4	dʒí(n) < *kɥe?	10	kɛŋ
5	bə(n)	20	'hand' (bwa?)*2?
6	mu(n)	100	ja
		1000	a-kpi

0.1.5.3 Awikam-Alladian

No numerical terms (except for 'one' and 'nine') are reconstructable on the sub-group level. This raises doubts as to whether these languages should indeed be grouped together. A representation of the pertinent forms is presented in the table below (Table 0.7) and may serve as a starting point for further discussion.

Table 0.7: Awikam-Alladian numerals

	Awikam	Alladian	**Awikam-Alladian**		Awikam	Alladian	**Awikam-Alladian**
1	ɛ́tɔ̰́	ɛ̄tɔ̰̀	**ɛ-to̰**	7	ɛ́byɔ̰́	ɛ̄bwɛ̀	**ɛ́-byɔ̰́, ɛ̄-bwɛ̀**
2	áɲɔ̰́	ā̰yrɛ̀	**á-ɲo̰, ā̰-yrɛ**	8	ètyɛ́	ēɥrì	**ɛ̀-tyɛ́, ē-ɥrì**
3	ázá̰	ā̰ò̰	**á-zá̰, ā̰-ò̰**	9	ɛ́mrɔ̰́	ɛ̄mwrɔ̀	**ɛ́-mrɔ̰́**
4	àná̰	ā̰zɔ̀	**à-ná̰, ā̰-zɔ̀**	10	èjú	ɛ̄và	**è-jú, ɛ̄-và**
5	à̰ɲú	ɛ̄nrì	**à-ɲú, ɛ̄-nrì**	20	èvɛ́	ɛ̄ɥá, *ɛ̄kòɥì	**è-vɛ́, ɛ̄-ɥá**
6	áwá	ɛ̄wrè	**á-wá, ɛ̄-wrè**	100	àkpá ˈ-ɲú	20*5	**20*5, àkpá ˈ-ɲú**

0.1.5.4 Potou-Tano

0.1.5.4.1 Potou

The following forms are distinguishable in the Potou sub-group (Table 0.8):

Table 0.8: Potou numerals

	Ebrie	Mbato	*Potou		Ebrie	Mbato	*Potou
1	bɛ̰̀ /brɛ̀	lóɓō	**bɛ̰̀ /brɛ̀, ló-ɓō; ce/se**	7	ákʰwácʰè	óɓīsɛ̰́	**6+1**
2	mɔ̰̀	ón̯ɔ̰́	**n̯ɔ̰́**	8	áɓyá	ógɓī	**ɓyá/ gɓī**
3	ɓwàɗyá	nɛ̰́jē /nój̄ē	**ɗyá/je**	9	áɓrɔ̀	ótrū	**ɓrɔ̀, trū**
4	ɓwèɗĭ	nɛ̰́ní/nón̯í	**ɗi/ni**	10	áwɔ́	ówā	**wɔ**
5	mwà̰ná	nɛ̰́n̄ā	**n̯a**	20	ápʰɛ̰̀	ópɛ̰̄	**pɛ**
6	ákʰwá	ókoā	**kwa**	100	àyà	yǎ	**ya**

0.1.5.4.2 Tano

The Tano branch consists of nearly thirty languages. It seems reasonable to treat them by sub-groups.

3.2.5.4.2.1. Western Tano

Table 0.9: Western Tano numerals

	Abure1	Abure2	Eotile	**Western Tano**
1	okuè	ókúè	ìkɔ̀	**o-kue**
2	aɲù	áɲû	àɲɔ́	**a-ɲu(n)**
3	nŋà	ɲ́ŋâ	àhá	**n-ha(n)**
4	nnàn	ń́nâ	ànɛ̀	**n-na(n)**
5	nnú	ǹnú	ànù	**n-nu(n)**
6	ncɪ̀ɛ	ɲ́cíɛ̀	àhíɛ̀	**n-cíɛ̀/híɛ̀**
7	ncùn	ɲ́cɔ̃̀	àfà	**n-cùn, à-fà**
8	mɔ̀kʊ̀ɛ́	mɔ̀kúè	ànɛ̀mrɔ̀	**mɔ̀-kʊ̀ɛ́, à-nɛ̀mrɔ̀**
9	puáléhùn	pʊ̀àlɔ̀hɔ̃̀	brúkú	**puáléhùn, brúkú**
10	óblún	òbùlú	èdí	**ò-bùlú, è-dí**
20	ɛ́fín	ɛ́fĩ̀	èfè	**ɛ́-fɪ(n)**
100	ɛ̀vá okuè	ɛ̀yǎ kű́ɛ	átá	**ɛ̀-vá /ɛ̀-yǎ, átá**
1000	akpí okuè			**a-kpi**

3.2.5.4.2.2. Central Tano Akanic (Table 0.10):

Table 0.10: Akanic numerals

	Akan1 (Twi dial.)	Akan2	Abron1	Abron2	*Akanic
1	baakó~	baakő	bakũ	bìàkɔ́ʔ	**ba-kó(n)**
2	əbìé-ń	mmie-nú	mie-nu	mḭ̀ènṵ́ʔ	**mie-nú**
3	əbìè-sá~	mmeɛ-nsǎ	mie-nsá	mḭ̀ènzá̰ʔ	**mie-nsá(n)**
4	à-náń	(ɛ)náń	nain	ńná̰í	**náín**
5	ə-núḿ	(e)núḿ	num	ǹnṵ́m	**núḿ**
6	ə-sìá~	(e)nsĩǎ	nsiã	ǹzìà̰	**sìá(n)**
7	ə-sɔ́ń	(ɛ)nsóń	nsɔ	ǹzɔ̰́ɔ̰́	**só(n)**
8	à-wòʨɥé /tw/	nwɔtwé	ŋɔtʃwie	wɔ̀cɥí	**twé/cué**
9	à-króń	(ɛ)nkróń	ŋkrɔŋ	ǹgɔ́nɔ̰́	**n-króń**
10	dú	(e)dú	du	dúʔ	**dú**
20	ədùònú	aduonú	edu enu	àdɥ̀ònṵ̀	**10*2**
100	ɔ̀hà	ɔha	ɔha	hà	**ɔ-ha**
1000	àpíḿ	apéḿ	apim		**a-píḿ**

3.2.5.4.2.3. Bia The numeral systems in these languages (Agni, Baoule, Sefwi, Nzema, Ahanta, and Jwira-Pepesa) are virtually identical and can be described as follows (Table 0.11):

Table 0.11: Proto-Bia numeral system (*)

1	ko(n)	7	su(n)
2	nu, ɲɔ̀(n)	8	cʊɛ/twɛ
3	sa(n)	9	ǹgɔ̀lɑ̀̃, nkróń
4	na(n)	10	bulu
5	nu(n)/nu(m)	20	10*2
6	sia(n)	100	ya
		1000	akpi

3.2.5.4.2.4. Guang This sub-group has two branches, Southern and Northern Guang which consist of four and eleven languages, respectively). Despite, the Guang numeral systems do not differ significantly, hence quoting individual forms seems unreasonable. Our reconstructions for both branches, as well as the general Guang reconstruction, are given below (Table 0.12):

Table 0.12: Guang numerals

	*Northern Guang	*Southern Guang	**Guang
1	kɔ́	kɔ	**kɔ**
2	ɲɔ́	ɲɔ́	**ɲɔ́**
3	sá	sa(n)	**sa(n)**
4	ná	nɛ(n)/na	**na(n)**
5	nú(n)	nu/ni	**nu(n)**
6	síyé	siɛ(n)	**siɛ(n)**
7	súnɔ́	súnɔ̃́	**súnɔ(n)**
8	bùrùwá, kwé	twi/cwi	**bùrùwá, kwé/cwi**
9	kpɔnɔ, sàngɔ́ɔ́ʔ	kpunɔ	**kpunɔ, sàngɔ́ɔ́ʔ**
10	dú	du	**du**
20	o-ko, 10*2	10*2	**10*2, ko?**
100	lafa (< Akan?)	ɔlɔ̀fɛ́/lafa	**lafa**
1000	kpíŋ, pim	a-kpe	**kpi(N), pim**

3.2.5.4.2.5. Krobu; Basilia-Adele; Ega To make our presentation complete, the evidence of these three isolated Tano languages is presented in the table below (Table 0.13):

Table 0.13: Numerals in Tano isolated languages

	Krobu	Basilia-Adele	Ega
1	kɔ́	kõ̂, li/diŋ	ì-lō-gɓó
2	ń-ɲɔ́	ɲúà̰	ì-ɲɔ̀
3	ń-sá̰	sa	ì-tà
4	ń-ná̰	na	ì-lɛ̀
5	ń-nṵ̀	ton, nun	ì-ŋwè
6	ń-sỹ̄ɛ̰̄	koron	5+1
7	ń-sô̰	6+1?	5+2
8	mɔ̀-kwɛ́	4-4, cɥ́ɛ́	5+3
9	ŋ̀-grɔ̀ā̰	-1, gwalan	5+4
10	brú	fo, teb, bulu	ì-zù
20	à-brūā̰ɛ́ (10*2?)	dikpilin, koo, bulV	ú-glū
100	yǎ	20*5	20*5
1000		kpen?	

0.1.6 Proto-Kwa

Intermediate reconstructions suggested above should be compared in order to reconstruct the forms of the Proto-Kwa numerals. It seems reasonable to group potentially related forms (or patterns) together. The rightmost column contains isolated forms attested in one particular group only.

0.1.6.1 'One'

Table 0.14: Kwa stems for '1'

	1	1	1	1
*Ga-**Dangme**	ká-kē, *go/wo			é-kòmé
*Gbe	ḍe-kpo	è-ḍe		
*Ka-Togo		di		
*Na-Togo	i-wɛ/kpɛ?	di(N)?		
Nyo:				
*Agneby	N-kpɔ	*a-ri		ɲ-âm
Attié	kə(n)			
Awikam			ɛ́-tɔ̰́	
Alladian			ɛ̄-tò̰	
Potou-Tano				
Potou	*ce/se			bɛ̰̀ /brɛ̀, ló-ɓō
Tano				
Western	o-kue			
Central				
Akanic	ba-kó(n)			
Bia	ko(n)			
Guang	kɔ			
Krobu	kɔ̰́			
Ega	ì-lō-gɓó	ì-lō-gɓó (< *li-kpo?)		

The Awikam-Alladian term for 'one' is definitely an innovation.

The root *di* is attested in four branches out of five and thus is likely reconstructable at the Proto-Kwa level.

The forms given in the left column are more problematic. Each of them contains a velar consonant (the Potu form *ce* may have resulted from the palatalization of a velar before a front vowel, *ce < *kue* – cf. Western Tano).

Regular phonetic correspondences between these languages have not been established and therefore cannot be used for purposes of reconstruction. In any

case, the following considerations might prove useful for the NC reconstruction. The inventory of forms attested in the eighty Kwa idioms may seem rather diverse. However, only two of them may be considered for the Proto-Kwa reconstruction, namely *di* and *k(p)o* (or the compound form *di-kpo* suggested by the Gbe (*ɖe-kpo*) and Ega (*li-gɓó?*) forms).

0.1.6.2 'Two'

Table 0.15: Kwa stems for '2'

	'2'	'2'	'2'	'2'
*Ga-Dangme	é-ɲɔ̀(n)			
*Gbe			è-ve/e-wè	
*Ka-Togo		din		bha
*Na-Togo	i-nyɔ			
Nyo				
*Agneby	a-ɲʊ̱/nɔ̄			
Attié			mwə(n)	
Awikam	áɲɔ̰́			
Alladian		ā̰yrɛ̀		
Potou-Tano				
Potou	no̱ɔ́			
Tano				
Western	a-ɲu(n)			
Central				
Akanic	mie-nú			
Bia	nu, ɲɔ̀(n)			
Guang	ɲɔ́			
Krobu	ɲ́-ɲɔ̰́			
Ega	ɩ̀-ɲɔ̀			

The only form reconstructable at the Proto-Kwa level is evidently *ɲɔ*.

0.1.6.3 'Three' and 'Four'

Table 0.16: Kwa stems for '3' and '4'

	'3'	'4'	'4'
*Ga-Dangme	é-tɛ̃		é-ɟwɛ̀
*Gbe	è-tɔ̃̀	è-nɛ̀	
*Ka-Togo	ta	na/nɛ	
*Na-Togo	i-ta	i-na	
Nyo			
*Agneby	a-ti(N)/ri	a-ní̃/la	jar
Attié	ha(n)		dʒí(n) <* kɥe?
Awikam	ázá̃	àná̃	
Alladian	ā̰ò̰		ā̰zɔ̀
Potou-Tano			
Potou	ɗyá/je	ɗĩ/ni	
Tano			
Western	n-ha(n)	n-na(n)	
Central			
Akanic	mie-nsá(n)	náín	
Bia	sa(n)	na(n)	
Guang	sa(n)	na(n)	
Krobu	ń-sá̰	ń-ná̰	
Ega	ì-tà̃	ì-lɛ̀	

Just as in the majority of the NC branches, the roots for 'three' and 'four' are the most persistent. Suggested Proto-Kwa reconstructions are *ta* and *na* respectively.

0.1.6.4 'Five'

Table 0.17: Kwa stems for '5'

	'5'	'5'	'5'
*Ga-Dangme		é-nùɔ̃	
*Gbe	à-tɔ́ɔ̃		
*Ka-Togo	tu(N)		
*Na-Togo		i-no(N)	
Nyo			
*Agneby		o-ne	lɔ̀hʋ̃̀, jên
Attié			bə(n)
Awikam		àɲú	
Alladian			ɛ̄nrì
Potou-Tano			
Potou		na̲	
Tano			
Western		n-nu(n)	
Central			
Akanic		núɱ́	
Bia	nu(n)/nu(m)		
Guang		nu(n)	
Krobu		ń-nù	
Ega		ì-ŋwὲ̃	

The root **tan* ('five') is only traceable in the Left Bank languages. Another root, commonly attested in other languages (**nun*), is found in these languages as well. Both roots should be considered for the reconstruction (note that the former is comparable to the pertinent form reconstructed for Proto-Bantu).

0.1.6.5 'Six'

Table 0.18: Kwa stems for '6'

	'6'	'6'	'6'	'6'
*Ga-Dangme		é-kpà		
*Gbe			à-dɛ́/zɛ̃́	
*Ka-Togo	golo/koro			
*Na-Togo	golo/kolo	ku		
Nyo				
*Agneby		hu(n)		
Attié				mu(n)
Awikam				áwá
Alladian	ɛ̄-wrè			
Potou-Tano				
Potou		kwa		
Tano				
Western			n-cíɛ̀/híɛ̀	
Central				
Akanic			sìá(n)	
Bia			sia(n)	
Guang			siɛ(n)	
Krobu			ń-sỹɛ̰̃	
Ega				5+1

The evidence presented in Table 0.18 is inconclusive. At this stage our task is to process the complex Kwa data so that it can be compared to the evidence of other NC languages. In this respect, three provisional Kwa forms are noteworthy: *golo/kolo, *kua,* and *ciɛ.* In any case, as the forms for 'seven' suggest, the Proto-Kwa term for 'six' was probably primary.

0.1.6.6 'Seven'

Table 0.19: Kwa stems and patterns for '7'

	'7'	'7'	'7'	'7'
*Ga-Dangme	6+1			
*Gbe				5+2, 'hand'+2
*Ka-Togo	6+1			
*Na-Togo	6+1			
Nyo				
*Agneby	6+1		bu(n)	
Attié		nson		
Awikam			ɛ́byɔ̰́	
Alladian			ɛ̄bwɛ̰̀	
Potou-Tano				
Potou	6+1			
Tano				
Western		n-cʋ̀n		
Central				
Akanic		só(n)		
Bia		su(n)		
Guang		súnɔ(n)		
Krobu		ń-sô		
Ega				5+2

The forms presented in the table above point toward the pattern '6+1' being used for the Proto-Kwa term for 'seven', whereas Proto-Nyo developed the primary term *sun*.

0.1.6.7 'Eight'

Table 0.20: Kwa stems and patterns for '8'.

	'8'	'8'	'8'	'8'	'8'
*Ga-Dangme					6+2
*Gbe		e-ɲí	'hand'+3		
*Ka-Togo	4*2	nsɛ/lɛ?			
*Na-Togo	4PL				
Nyo					
*Agneby				è-pyè	wo(n)
Attié	ma-4?				10-2?
Awikam		ɛ̀tyɛ́			
Alladian		ēɥrì			
Potou-Tano					
Potou				ɓyá/gɓī	
Tano					
Western		mɔ̀-kʋ̀ɛ́			à-nɛ̀mrɔ̰̀
Central					
Akanic		twé/cué			
Bia		cʊɛ/twɛ			
Guang		kwé/cwi			
Krobu		mɔ̀-kwɛ́			
Ega			5+3		

Based on the evidence attested in the table above, the Proto-Kwa term for 'eight' may be reconstructed as either primary (*kwe/ kye*) or derivative, in which case it must have been based on 'four' (*'4PL').

0.1.6.8 'Nine'

Table 0.21: Kwa stems and patterns for '9'

	'9'	'9'	'9'	'9'	'9'	'9'
*Ga-Dangme						nɛ̃́ɛ̃́(hṹ)
*Gbe	8+1		5+4			
*Ka-Togo	8+1?		10-1			
*Na-Togo			10-1			
Nyo						
*Agneby		bare(-n)				
Attié					ŋgwan	
Awikam		ɛ́mrɔ̃́				
Alladian		ɛ̄mwrɔ̀				
Potou-Tano						
Potou		ɓrɔ̀				trṹ
Tano						
Western		brúkú				puálɛ́hʋ̀n
Central						
Akanic				n-krón		
Bia				nkrón	ǹgɔ̃̀lɑ̃̀	
Guang						kpunɔ, sàngɔ́ɔ́ʔ
Krobu					ǹ-grɔ̀ā	
Ega			5+4			

This is the hardest form to interpret. A rare pattern '8+1' is attested in the Left Bank languages. In contrast to this, the Togo pattern is '10-1', while the Nyo term (*brɔ/mrɔ*) is 'primary'. The latter is probably connected to the term for 'ten', although this connection does not necessarily imply a derivation ('10-1') and could be explained by analogy. All three forms/patterns are considered for reconstruction.

0.1.6.9 'Ten'

Table 0.22: Kwa stems for '10'

	'10'	'10'	'10'	'10'	'10'	'10'
*Ga-Dangme						ɲɔŋmá
*Gbe	e-wó	*bula				
*Ka-Togo	fo/wo	bula			te	
*Na-Togo	fo		ɗu		təb	
Nyo						
*Agneby				diw/liw		nɛ(n)<5PL?
Attié						kɛŋ
Awikam			èjú			
Alladian	ɛ̄-và					
Potou-Tano						
Potou	wɔ					
Tano						
Western		ò-bùlṹ		è-dí		
Central						
Akanic			dú			
Bia		bulu				
Guang			du			
Krobu		brú				
Ega			ì-zù			

Isolated forms are attested in Ga-Dangme and Attié. The root *tə(b)* is traceable in the Ghana–Togo Mountain languages (Togo-remnant) and is not found elsewhere. Thus we are dealing with another isogloss suggesting that these languages belong to the same branch. The stem **du* supported by R. Blench could be proposed for Proto-Kwa. This stem is indeed attested in the majority of the groups that do not belong to the Left Bank languages (including Na-Togo).

The stem **bula* (Left Bank)/**bulu* (Tano) is distributed fairly evenly.

Finally, a Niger-Congo root reflected in Kwa as **fo/wo* can be reconstructed in a number of languages.

0.1.6.10 'Twenty'

Table 0.23: Kwa stems and patterns for '20'

	'20'	'20'	'20'	'20'	'20'	'20'
*Ga-Dangme	10*2					
*Gbe	10*2	ko				
*Ka-Togo	10*2					
*Na-Togo	10*2	ā-kōō	dìkpìlìn			ɔ-ḍɔ(n) (<10?)
Nyo						
*Agneby	'hand' (bra)*2?		li-kŋ			
Attié	'hand' (bwa?)*2?					
Awikam				ɛ̀-vɛ́		
Alladian		*ɛ̄kòɥì		ɛ̄-ɥá		
Potou-Tano						
Potou					pɛ̠	
Tano						
Western					ɛ́-fɪ(n)	
Central						
Akanic	10*2					
Bia	10*2					
Guang	10*2	ko?				
Krobu	à-brūāɛ̰́ (10*2?)					
Ega						ú-glū

The pattern '10*2' attested in the majority of the branches. The root *ko is also to be taken.

0.1.6.11 'Hundred' and 'thousand'

Table 0.24: Kwa stems and patterns for '100' and '1000'

	'100'	'100'	'100'	'100'	'1000'	'1000'
*Ga-Dangme	làfá		ò-há		à-kpé	
*Gbe				40*2+20	à-kpé	
*Ka-Togo	lafa?				a-kpe	
*Na-Togo	lofa	20*5	u-ga		a-kpi	pim?
Nyo						
*Agneby		20*5	ja		a-kpi	
Attié			ja		a-kpi	
Awikam				àkpá ˈ-2		
Alladian		20*5				
Potou-Tano						
Potou			ya			
Tano						
Western			ɛ̀-vá /ɛ̀-yǎ	átá	a-kpi	
Central						
Akanic			ɔ-ha			a-pím̀
Bia			ya		a-kpi	
Guang	lafa				kpi(N)	pim
Krobu			yǎ			
Ega		20*5				

In addition to the pattern '20*5', the roots *lafa/lofa* and *ya/ja* (Nyo) are reconstructable for 'hundred'. The latter may be etymologically related to *ga/ha.

The term for 'thousand' is commonly attested as *a-kpi. Its less common byform is *pim.

The following table lists provisional Proto-Kwa reconstructions based on the evidence discussed above:

Table 0.25: Proto-Kwa numeral system (*)

1	di-kpo	7	6+1
2	ɲɔ, **di?	8	4PL, kwe/kye
3	ta	9	10-1?
4	na	10	fo/wo, bula, du
5	nu(n), ton	20	10*2, ko
6	golo/kolo, kua, ciɛ	100	20*5, lofa, ja/gya?
		1000	kpi, pim

The remaining roots and patterns are probably innovations that developed separately within a branch/language. They may help to adjust the internal classification of the Kwa languages.

0.2 Ijo

According to traditional classification, the Ijo family is comprised of the Ijaw languages and the Defaka language. Some scholars express doubts as to whether the latter indeed belongs to this family. According to Roger Blench, "The Ijo languages constitute a well-founded group, but the membership of Defaka (constituting Ijoid) remains problematic. Defaka has numerous external cognates and might be an isolate or independent branch of Niger-Congo which has come under Ijo influence" (**Blench1993NigerCongo**).

Ijaw languages consist of the Eastern and the Western groups (the latter is sometimes called Central).

The following reconstruction is based on the evidence of all three Ijo branches (Table 0.26):

Table 0.26: Proto-Ijo numeral system

	Defaka	*East	*West	**Ijo
1 (qualifying)	gbérí	gbérí	?	?
1 (counting)	?	ǹgèi	kènɪ	*n-kèni
1 in 6 (5+1)	–	die/ie	die/zie	*die
2	mààmà	màmì	maamʊ	*mamV
3	táátó	tárú	tǎrʊ	*tató
4	nέì	i-neĭ	nέín/nóín	*nέín
5	túúnɔ̀	sónó	sõnɔ̃-rɔ̃	*túnɔ́
6	mààngò	5+1	5+1	*5+1
7	5+2	5+2	5+2	*5+2
8	5+3	4+4	4+4	*4+4
9	5+4	5+4	5+4?	*5+4
10	wóì	ójí /àtìé	ójí	*(w)ójí
15	10+5	jìé	dié	*dié
20	síì	sí	síí	*síí

Both qualifying and counting terms for 'one' are attested in the Eastern Ijo languages (e.g. in Ibani). The Defaka form may be a borrowing. An unexplained allomorph for 'one' is attested as a part of the term for 'six' in Ijaw (?).

The root for 'two' (*mam*) is an Ijo innovation. It has no parallels outside this language family. Its phonetic similarity to several other forms is a mere coincidence, e.g. *ma-* in the Jaad (Atlantic) *maaɛ* does not belong to the root and can be

explained as a class prefix. The lexical meaning 'twin, pair' (as attested in Nembe (East) according to (**Kaliai1964**)) may underlie the Ijo term. However, no reliable parallels for this term with the meaning 'twin, pair' are establishable in NC.

The root for 'three' is apparently of NC origin, with its most archaic form attested in Defaka.

The term for 'four' is undoubtedly a reflex of the NC root.

The term for 'five' probably goes back to the NC root **tan(o)*. As in the case of 'three', its most archaic form is found in Defaka.

The terms for 'six', 'seven', and 'nine' follow the common patterns ('5+1', '5+2', and '5+4' respectively).

The Ijaw term for 'eight' must have derived from 'four' by means of partial reduplication (**ni-nέín*). This pattern is reconstructable on the Proto-NC level and will be discussed at length in the next chapter.

A specific counting term for 'ten' is reconstructable in the Eastern Ijo languages (**àtìé*). The Defaka form is comparable to those found in the Ijaw languages.

A special form for 'fifteen' is reconstructable in Ijaw (**dié*), cf. e.g. the Nembe evidence: *dìé-èsí* '300' (='15*20'). This form may go back to Ijaw **díὲ* 'divide; separate into parts; split or break up into parts; share', 'distribute, donate', cf. Nembe *dìὲ*, Ibani (**Koelle1963**) *dìè-, dìé.*

As in a number of other languages that belong to different families within NC, a special form is attested for the term for 'twenty' (**síí*). The term itself has several functions. It serves as a basis for a number of other terms for tens (also in Defaka), e.g. '40=20*2', ... '100=20*5'. The Ijaw terms for 16-19 are based on it as well, e.g. '16=20−4', etc.

0.3 Kru

Our analysis of the Kru numerals is based on nearly forty sources representative of five major groups and eleven major subgroups of the family. Preliminary reconstructions of the pertinent numerical terms (by sub-group) are represented in commented tables below.

0.3.1 'One', 'Two' and 'Three'

Table 0.27: Kru stems for '1'-'3'

	'1'	'1'	'1'	'2'	'2'	'3'
Aizi		mu̱mɔ̱	yre	i-ʃɩ		i-ta
Eastern						
Bakwe/Wané	ɗô			sɔ̂		ta
Bete/Godié		ɓlo/gbolo		sɔ		ta
Dida/Neyo		bolo		sɔ́		ta
Kodia		gbɤlɤ/ɓɤlɤ		sɔː		taː
Kuwa	dee			sõr		tã�à̃
Seme	dyuɔ̃		byɛ́ẽ		nĩ	tyáār
Western						
Bassa[1]	doo	(g)boo?		sɔ́̃		tã
Grebo[2]	do(o)			sɔ̃̌	hwɛ̃/hɔ̃	taa(n)
Klao/Tajuasohn	do			son		tan
Wee[3]	due/too			sɔn		taan

As in the majority of the NC languages the term for 'three' is the most persistent: the root *taa(n)* can be reliably reconstructed for Proto-Kru.

The same is applicable to the root for 'two' reconstructed as *so(n)* in Proto-Kru (isolated forms are attested in the Seme and Grebo sub-groups only). It should be noted that in general the Seme numeral system is peculiar in many respects. These peculiarities (e.g. Seme being the only language with a full set of primary terms covering the sequence from 'one' to 'ten') may be due to the isolated status of the language. In his recent article entitled "Le sèmè/siamou n'est pas kru" Vogler argues that Seme is not a Kru language (see **Vogler2015**). On the basis of a comparison between Kru, Gur and Mande (Samogo) morphology and lexicon he concludes that Seme is either remotely related to the Mande languages or represents a separate branch of Niger-Congo. As we hope to demonstrate below, Seme shows systematic correspondences with neither Kru nor Mande (including the contact Mande languages – Samogo and Jowulu).

---

[1] Bassa, Dewoin, Gbii.

[2] Grebo, Krumen, Glio-Oubi.

[3] Wee is a Western Kru group which includes (among other languages) Sapo, Krahn, Nyabwa, Wobe.

'One'. It is likely that the root **do* should be reconstructed on the Proto-Kru level. However, there is enough evidence for reconstructing the alternative root **(g)bolo.*

0.3.2 'Four' and 'Five'

Table 0.28: Kru stems for '4' and '5'

	'4'	'4'	'4'	'5'	'5'	'5'
Aizi			yeɓi	yu-gbo		
Eastern						
Bakwe/Wané		hɪɛ̃[4]	mɾɔ̄:	ɠɓɔ̀ɔ̄, ŋʷũ		
Bete/Godié			mʊ-wana	gbu/gbi		
Dida/Neyo	na			gbí		
Kodia	na			ⁿgbɤ		
Kuwa	ɲìjèhɛ					wàyɔ̀ɔ
Seme			yur			kwɛ̃̀l
Western						
Bassa	hɪ̀-nyɛ(n)				h-mm	
Grebo		hɛn		gbə	mm	hun
Klao/Tajuasohn	nyìɛ	hɛn			mù, hoom? (< m?)	
Wee	nyìɛ				mm	

The forms for 'four' in the left column apparently are the reflexes of the NC root that is preserved in its archaic form **na* in Eastern Kru, whereas in Western Kru it changes into *nyìè*.

Two major forms are observable for 'five', namely **gbə/ gbo* and **mm* (Western).

0.3.3 'Six' to 'Nine'

Table 0.29: Kru stems and patterns for '6'-'9'

	'6'	'6'	'7'	'7'	'8'	'8'	'8'	'9'	'9'	'9'
Aizi		fɔ	fri+2				patɛ			fi
Eastern										
Bakwe/Wané	5+1		5+2		5+3			5+4		
Bete/Godié	5+1		5+2		5+3			5+4		
Dida/Neyo	5+1		5+2		5+3			5+4		
Kodia	5+1		5+2		5+3			5+4		
Kuwa	5+1		5+2		5+3			5+4		
Seme		kpã̂â		kĩ̂î			kprɛ̃̂n̂			kɛ̄l/kal
Western										
Bassa	5+1		5+2		5+3			5+4		
Grebo	5+1		5+2		5+3			5+4		
Klao/Tajuasohn	5+1		5+2			4PL			10-1	
Wee	5+1		5+2		5+3			5+4		

It is immediately apparent that these numerals already followed the pattern '5+X' in Proto-Kru. As noted above, the Seme forms are innovations.

0.3.4 'Ten' and 'Twenty'

Table 0.30: Kru stems for '10' and '20'

	'10'	'10'	'20'	'20'	'20'
Aizi	bɔ		gu		
Eastern					
Bakwe/Wané	pʊ̀, bu?		grʊ̀, gˀlɔ		
Bete/Godié		kʊ́gba	gwlʊ̌ /gɔlɔ		
Dida/Neyo		kʊ́gba	glʊ̌/góló		
Kodia		kʊgba	ǧalo		
Kuwa		kowaa		10*2	
Seme	fu				kār
Western					
Bassa	ɓaɖa-bùè, puuɛ, vu			<10	
Grebo	pu		gōrō/wlʊ̀		
Klao/Tajuasohn	pue/punn		wlòh-2		quilar-2
Wee	pue/bue		gwlʊ-2		kwela 2

The root *kʊgba* is attested beside the common NC root for 'ten' (**pu/fu*) in Eastern and Kuwa. The root for 'twenty' is attested as *golo* in both Eastern and Western.

0.3.5 'Hundred' and 'Thousand'

Table 0.31: Kru stems and patterns for '100' and '1000'

	'100'	'100'	'1000'	'1000'	'1000'
Aizi		juyugbo			
Eastern					
Bakwe/Wané	20*5		400*2+20*10		
Bete/Godié	20*5		400*2+200		
Dida/Neyo	20*5		400*2+200		
Kodia					
Kuwa		kɔlɛh?		100*10	
Seme	20*5				lit: 'goat one'
Western					
Bassa	20*5				borrowed
Grebo	20*5				borrowed
Klao/Tajuasohn	20*5				borrowed
Wee	20*5				?

All Kru sub-groups are characterized by the lack of a primary term for 'hundred'.

The form for 'thousand' in Western Kru was borrowed from the Mande languages. A primary term for '400' (*dwi) that developed in the Eastern Kru served as the basis for a rare pattern for 'thousand' attested in these languages ('400*2+200').

The reconstruction of the Proto-Kru numeral system is as follows:

Table 0.32: Proto-Kru numeral system (*)

1	do, (g)bolo	7	5+2
2	so(n)	8	5+3
3	taa(n)	9	5+4
4	na	10	pu, kʊgba?
5	gbə/gbo, mm	20	golo
6	5+1	100	20*5
		1000	400*2+200

0.4 Kordofanian

The evidence of about twenty Kordofanian languages does not permit reconstructing the Proto-Kordofanian numeral system (assuming that Proto-Kordofanian existed). Comprehensive data for each of the four major groups is represented below (Table 0.33). Forms and patterns traceable in at least two groups are in bold. The forms are grouped within the lines in a more or less ad hoc manner, e.g. there is no special reason to believe that Talodi *lu(k)/ li(k)* 'one' corresponds to the forms with initial **t**-/**ţ**- attested in other groups.

The systematic presence of the final velar -**k** in some of the terms can also be found in the Atlantic languages (especially in North Atlantic).

The term for 'ten' appears in numerous forms in the Kordofanian languages, which is rare. At the same time, no root for 'ten' is represented in at least two languages simultaneously. Moreover, nearly every language in a group has its own term for 'ten'.

A primary term for 'eight' is distinguishable[4] in the Heiban and Rashad languages.

---

[4]I used data from the following Kordofanian languages and dialects: Aceron, Dagik, Heiban, Jomang, Katla, Koalib, Lafofa, Laro, Logol, Lumun, Moro, Nding, Orig, Rere, Shirumba, Tagoi, Talodi, Tegali, Tegem, Tima, Tira, Tocho, Utoro, Warnang.

Table 0.33: Kordofanian numerals 1–5

	*Heiban	*Katla	*Rashad	*Talodi	*Kordofanian
1	kwɛ-(ʈ)ʈɛ(k)	ʈí-ʈʌk	-tta	lu(k)/li(k)	**ʈe(k)/ lu(k)**
1	ŋɔ-(ʈ)ʈɔ	ʌ-ʈeen/ʈɪɪn			**ʈɔ(n)**
1	*-lel?			tleidi	**lel/ led?**
2		cik/heek	(k)ko(k)		**kok/kek/ cik**
2	-can /-ɽan, rɔm			we-ɽʌk/-tta	**(can/ɽan, rak, rɔm)**
3	tɔɽɔl/ʈeɽel	ʈʌʈ	tta	wa-ʈʈak	**tat/tɔ̀ɽ/ ʈak**
3	-ɽɪcɪn/-gɪtʃɪn	i-hwʌy			**(ɽitin/ɽicin, hwʌy)**
4	k(w)ɔ-ɽɔŋɔ/ma-ɽŋan/-rlon/-ɬɽʊ		ya-rem/wa-rʊm	-ɽandɔ	**-ɽɔŋ/-ɽandɔ/-ranto/-rʊm?**
4		ʌ-gʌlʌm/i-hʌlʌm		kekka	**(-gʌ́lʌm, kekka)**
5	tʊ-dìní/-ðɛnɛ	i-duliin			**dinin/ dulin?**
5	ŋer-/ɲer-		*ɲer-		**ŋer-/ ɲer-**
5		ɟɔ-gbəlɪn	wʊ-ram, ma	'hand'-'1', ki-liəgum	**('hand', …)**

Table 0.34: Kordofanian numerals >5

	*Heiban	*Katla	*Rashad	*Talodi	*Kordofanian
6	5+1	<5	ɲere(-r/-l/-y) (< *5+1?)	5+1	**5+1**
6	3+3? 3PL				(3+3)
7	5+2	5+2	5+2	5+2	< A5+2
7	4+3	3PL+1			(4+3, 3PL+1)
8	duuba(ŋ)		dubba/tuppa		**dubba**
8	5+3, 4redupl.?			5+3, 4 redupl.	**5+3**, 4 **redupl**.
8	bɔ	t̪ʌ́ŋgìl/t̪ŋɛrɛy			(bɔ, t̪əŋi-)
9	10-1	10-1	10-1		**10-1**
9	5+4	ɟʌ́lbʌt̪ín (<5?)		5+4	**5+4**
10	di/d̪i/ri	*t̪ʌʌ, ɔ-rɔ	kʊ-man (5PL)	ma-tu(l)	?
10		rakpac, i-hedʌkun	fəŋən (fə-ŋən?)	tiəɽum, ṉipɽa, gurruŋ)	?
20	10*2	10*2	10+10	10*2	10*2
20	tuɽí ('grain'), 'big figure'			'body', (a-rial, a-(na)ttu)	('body', …?)
100	20*5, < Arabic	10*10	10*10	10*10, 20*5	10*10, 20*5
1000	rabic, 20*2*10	absent	10*10*10	ɑ-ðɑɾ	?

0.5 Adamawa

Adamawa is the most divergent of the NC families. The variety of numeral systems attested in the Adamawa languages confirms this statement. This can be observed not only in cases of forms that belong to different groups, but often within groups and sub-groups as well, which makes the reconstruction of its numeral system quite problematic. In other words, it is not a rare case that small Adamawa branches consisting of only a pair of languages show incomparable forms. Some examples are in order here.

Let us compare the terms from 'one' to 'ten' in the Kim branch that is commonly attributed to the Mbum-(Day) group (Greenberg 14) (Table 0.35):

Table 0.35: Numerals in the Kim branch

	Besme	Kim
1	mōndā/mbírāŋ	ɗú
2	tʃírí	zí
3	hā̠sī (hā̠-sī?)	tā
4	ndày	ndà
5	ndìyārá	nūwē̠y
6	māngùl	mènèngāl
7	ɗīyārā	ɓēálā/ɓēálār
8	ndā-sì (4+3?)	tīmāl/wá-zì-zí(10-2)
9	nòmīnā	làmāɗō/wá-zì-ɗú (10-1)
10	wàl	wòl

Only the terms for 'four', 'six', and 'ten' are comparable in these systems.

The Longuda language constitutes a separate branch of Waja-Jen (Greenberg 10). The table below gives an overview of the first ten numerical terms as attested in two dialects of Longuda (Table 0.36). The evidence for both dialects was collected by the same scholar (Ulrich Kleinewillinghöfer[5]). Morphological analysis of the forms is given according to Longurama of Koola (Longuda1) and Wala Lunguda (Longuda2).

Although we are dealing with two dialects of the same language, the roots for 'one', 'two', 'three', 'six', and 'ten' attested in them are different. At the same time, the terms covering the sequence from 'six' to 'nine' follow patterns com-

---

[5]https://mpi-lingweb.shh.mpg.de/numeral/Niger-Congo-Adamawa.htm

Table 0.36: Longuda numerals

	Longuda1	Longuda2
1	laa-twè	naa-khal
2	nàà-kwɛ̃́	naaa-shir
3	nàà-tsə́r	naa-kwáí
4	nèé-nnyìr	naa-nyìr
5	nàà-nyɔ́	nàà-nyó
6	tsààtə̀n	na-khí-nà-kwáí (2*3)
7	í-néé-nyìr i-nàà-tsə́r(4+3)	nyi-na-kwáí (4+3)
8	nyíí-tìn (<4?)	nyí-thìn (<4?)
9	é-nàà-nyɔ́ í-néé-nyìr(5+4?)	nyi-na-nnyó (4+5)
10	koo	nɔ̂m

monly attested elsewhere. Thus the differences between these dialects appear to be greater than those between the languages within Mande or Bantu families. This raises the question as to whether a Proto-Kim or Proto-Longuda reconstruction is indeed relevant.

Moreover, the reconstruction is additionally hindered by the fact that numerical terms in the majority of the Adamawa languages are subject to the alignment by analogy more frequently than in other NC languages. General considerations regarding this problem can be found in Chapter 2. This is of special significance for the Adamawa languages since it affects etymological interpretations. The evidence from a number of languages belonging to the Duru sub-group of Leko-Nimbari (Greenberg 4) may serve as a case study (Table 0.37).

Table 0.37: Duru numerals

	Peere	Doyayo	Gimme	Gəunəm	Vɔmnəm	Momi	Longto
1	də́ə	gbúnú	wɔɔna	mani	màn	muzoz	wə́ŋŋá
2	iro	éérɛ́	idtigè	tɛk	ètên	ìttə́z	sittó
3	tããro	taarɛ	taagè	taarək	tāán	tàáz	tããbó
4	naro	násɔ	náàgè	náárə́k	nānnò	náz	nabbó
5	núuno	nooné	nɔɔnɨ̀gè	nɔɔnɔ̀k	gbà náárò	gbanáá	nɔ̃ɔ̃mó
6	nón-də́ə	nɔ̀ɔn-gbúnú	nɔngè	nɔɔ-waŋgə	gbāā-sə̀ mâl	bámbə́z	sáámɛ

Matching final segments of the first few numerical terms in each of these languages are highlighted in red. I agree with Larry Hyman that "it might not be analogy, rather the use of a marker" (p.c.) but it should be noted that though these segments are different in each case (i.e. they do not match even within a pair of languages), they are present in each language under discussion.

In Mumuye-Yandang, which is another branch of Leko-Nimbari (Greenberg 5), an additional sub-morpheme (-t) is attested that is not present in Duru (Table 0.38):

Table 0.38: Analogical alignments in Mumuye-Yandang

	Mumuye	Bali	Yendang (dial.)
2	zi**ti**	i-ye	í-nī
3	ta:**ti**	taa**t**	tâ:**t**
4	dɛ̀:**tì**	naa**t**	nâ:**t**

The following conclusions with regard to the Proto-Duru numeral system can be reached upon the basis of this evidence. First, the final segments (whatever their phonetic difference) should not be viewed as a hinderance to the comparison of numerical terms. This means that Momi *tàáz* 'three' can (and should be) compared to Longto *tã̃ãbó*. The question of whether their final segments should be analysed as morphemes or sub-morphemes is of secondary importance for our purposes. At the same time, the quality of the second consonant in Proto-Leko-Nimbari is obscure, so we have to reconstruct the form as *taaX, where X is an unknown consonant.

As demonstrated above, numerical terms are exceptionally divergent within the family. In addition to this, systematic (diversified) alignment by analogy is often employed in the languages under study. Both factors make the reconstruction a challenging task, even though an attempt at reconstruction of the Adamawa numerals by a highly competent scholar is available (see **Boyd1989**). His results, however, are of limited relevance for our comparative purposes, as the following example shows. According to Boyd, the Proto-Adamawa term for 'one' is to be reconstructed as *ku-di-n* (the root *di*) with *kwin* being its later development. His ideas on how this proto-form is reflected in particular branches of the Adamawa family are summarized in the table below (Table 0.39). Notations in the first column refer to Grinberg's grouping of the Adamawa languages.

Even if Boyd's reconstruction of the Proto-Adamawa form is correct, a diachronic interpretation that impies an etymological relationship between *bim-*

Table 0.39: *kwin-* reflexes in Adamawa according to Boyd

	*Proto	Reflexes
G1	kwin	kun
G1	kwin	kwaan
G2	kwin	gu-(a)s(a)
G4	kwin	gun, gbun, bin, wun-ga, guu
G5	kwi(t)	gbet, gorV
G5	kwin	in(d)i
G6	kwin-k	soŋ
G7	kwin	indi > fa-ndi
G8	kwin-kwin	bimbimi
G8	kwi(n)	gwi > ju
G9	kwin	tsuŋ/tsiŋ, cɔŋ
G10	kwi-t	> kwat > kal
G13	kwit	ɓuru, gulu
G13	kwit	> kwat > bara(k)
G13	kwin	ʈoŋ
G14	kwin	ɗu
Day	kwin-k	ngoŋ
Day	kwin	(k)wan > mɔn

bimi, *cɔŋ*, *ɗu* and *gbet* does not fit the purpose of our integral comparative study of NC numerical terms because it can be used to justify nearly any etymological connection. In view of this, the Adamawa numerical terms will be treated in the same way as those from the preceding language families. First, the main forms of the numerical terms will be established, with no attempt at tracing them down to a provisional proto-form. Then the numeral systems of each of the Adamawa branches will be studied separately. Finally, an integral analysis of the available evidence pertaining to each of the terms will be offered. This approach will enable us to treat the Fali languages and even Laal together with the Adamawa languages, although their relationship to the latter is often questioned (in the case of Laal, doubts are raised as to whether it belongs to NC at all).

0.5.1 Fali-Yingilum (G11)

Table 0.40: Fali-Yingilum numerals103

1	kpolo/bʌlo (< *lo?)	7	jɔ̠rɔs
2	cuk, gbara	8	4 redupl.
3	taan (< taaX)	9	10-1/ŋgʌs kàm(kàn) k͡pòlò 'rest hand one'
4	naan	10	ra
5	kẽrɛw	20	10*2
6	yira/yilo	100	< Fula
		1000	< Fula

It should be noted that after a nasal, *-r-* in the Fali forms regularly corresponds to *-N-* in those of Yingilum, cf. '5' Fali *kɛ̠rɛw* ~ Yingilum *kɛ́ɲàu*, '7' *jɔ̠rɔs* ~ Yingilum *jɔ́nɔ̀s*. An alignment by analogy is probably attested in the terms for 'three' and 'four' (**taaX* > *taan* may have changed by analogy with **naan*).

0.5.2 Kam (Nyimwom, G8)

Table 0.41: Kam numerals

1	bii (Meek: bimbini) (< *b-ii?)	7	jùp yi-raak (6,2 - 'second six'?)
2	yi-raak (i-ra)	8	sâl
3	càr	9	níízaa
4	nár (< *naX)	10	bóò
5	ŋwún	20	kpáímí ,*ǹkpǫ́
6	jù:p	100	20*5
		1000	?

Within the NC context, a reversive alignment by analogy may be considered: *na*X '4' > *nar* by analogy with *car* '3'. As Boyd rightfully observes, in the case of 'one' it is often unclear whether the initial consonant is a part of the root, or a reflex of the noun class prefix.

The term for 'seven' simulates the pattern '7=6+2' (this phenomenon is not infrequent in NC). Sometimes (e.g. in some of the Mande languages) this impression is due to the fact that the term for 'six' originally derived from '5+'. Over time, an innovation replaced the original term for 'five', which was only preserved in the derived term for 'six'. Alternatively, the term for 'seven' could be explained as 'the other six' (or 'a big six' is some languages), as perhaps in Kam, assuming that *jù:p* does not go back to the term for 'five'.

0.5.3 Leko-Duru-Mumuye (G4, G2, G5)

[6]

0.5.3.1 Duru (G4)

Table 0.42: Duru numerals

1	dɔ́ə, gbúnú, wɔ́-ŋŋá/wɔɔna/dá(ŋ)gá/*nge, man(i)/*mal	7	5+2, (gútambe, 6+'odd', dɔ́msàrà, 4+3)
2	du/ru/to, te/re	8	4PL/4+4, 5+3,(< Hausa)
3	tãã̃tó/tãã̃ro	9	' one finger is left ', níŋsɨ́nè, 5+4, 10-1
4	nató/naró (< *naX)	10	bō̃ʔ, kob/kop/fób
5	núno/nɔɔnɨ̀, gbà náárò/gbanáá, sáá	20	gbɛg/gbàhsɨ́ (='staff'), *wɔ́ɔg ('head'), zul/zur ('head'), (10*2, ráárò, jùgúyɔ),
6	gúú, 5+1	100	tɛmere < Fula, 20*5
		1000	uzinere < Fula, (dukə)

This table provides an overview of forms and patterns attested in eleven sources for this sub-group. This degree of variety is not normally attested within a single sub-group, which raises doubts as to whether these languages should be grouped together.

0.5.3.2 Leko (G2)

Our study of this sub-group is based on the evidence of two languages. The summary table above is not descriptive of the language-specific mechanisms of the alignment by analogy. An overview of the numerical terms covering the sequence from 'two' to 'five' by language is provided below (Table ??. 107):

Apparently, the terms from 'three' to 'five' in these two languages are related to each other. At the same time, two groups of terms ('2-3' and '3-4') with an

---

[6]The group is often labeled Leko-Nimbari. Here we follow Raimund Kastenholz and Ulrich Kleinewillinghöfer, who note that 'The term 'Nimbari' should not to be used as a classificatory term, nor should the scarce and surely in large parts erroneous data be given central significance in any comparative approach to Adamawa languages' (**KastenholzKleinewillinghöfer2012**).

Table 0.43: Leko numerals

1	nín̄a/níiá (<ŋa?)		7	5+2
2	nnú, ra?, *-i?		8	5+3, < Hausa
3	toorà/toonú		9	5+4,' one is left '
4	naarà/nɛɛr-əb		10	kób/kóp
5	núúnà/núnn-ub		20	nɛd níi ɡbɛd, laa-1
6	nɔ̂ŋgɔ̂s/núŋgɔ́ɔs		100	20*5, < Fula
			1000	20*10?,< Fula

Table 0.44: Analogical alignments in two Leko languages

	Kolbila (Zurá)	Samba Leko
2	in**nú**	ii**rà**
3	too**nú**	too**rà**
4	nɛɛr**əb**	naa**rà**
5	núnn**ub**	núú**nà**

alignment by the ultima are observable in Kolbila. This is applicable to a group of Samba Leko terms as well, namely '2-4' (possibly also '5'; the fact that the Samba Leko terms are adjusted by both the vowel quality and the tone is noteworthy). This means that the seemingly unrelated roots for 'two' may have derived from a common etymon (still unknown to us) by means of alignment by analogy. The source form of 'two' remains obscure. Assuming that it was similar to the one reconstructed for the Duru sub-group (e.g. *ru*), it is likely that the same form is to be reconstructed for Leko as well: *ru* > Kolbila *nu* by analogy with *toonu* '3' ; *ru* > Samba Leko *rà* by analogy with *toorà* '3'. However, the evidence in favor of this reconstruction is inconclusive. Alternatively, the initial vowel of the term for 'two' (***ii**-/**in**-) may reflect the source root, while the final segment is potentially explained via an alignment by analogy with '3'.

0.5.3.3 Mumuye-Yandang (G5)

This sub-group is represented by three languages that show different forms of 'two'. The terms for 'three' and 'four' are adjusted by analogy. Studying them in a wider NC context reveals that the final consonant in 'four' was adjusted by anal-

Table 0.45: Numerals in Mumuye-Yandang

1	ɓīntī/ɓini (*< nti/ni?) , gbétè	7	5+2
2	ziti, ye, nī	8	5+3
3	taat	9	5+4
4	naat	10	kop/kob
5	mǎːni, nɔng/ghìnān	20	mba-1, kar-1, mim-1
6	5+1	100	20*5
		1000	derived

ogy with 'three'. The alignment itself must have occurred already at the Proto-Mumue-Yandang level, which explains our provisional reconstructions suggested for this proto-language in the table above.

No evidence pertaining to the Nimbari numerals is available to us. The forms of 'one' given by Boyd (**Boyd1989**) are noteworthy (Nimbari *(n)yeme/ geme/ (ʒeme?)*).

0.5.4 Mbum-Day (G13, G14, G6, Day)

0.5.4.1 Bua (G13)

This is very divergent branch that has been poorly documented. I'd like to thank Pascal Boyeldieu who has provided me with his personal data on Ɓa (Bua) and Lua (Niellim), as well as some other rare sources. The main forms and patterns are shown in Table 0.46.

Numerals in the Bua group can be presented as follows (Table 0.47)

0.5.4.2 Kim (G14)

The first ten terms of Besme and Kim are given in the table above (Table 0.35). The term for 'twenty' in these languages follows the pattern '10*2', whereas the Kim term for 'hundred' is borrowed from Arabic. The Besme term for 'hundred' is borrowed from the French *sac* 'sack', whereas the term for 'thousand' is borrowed from Bagirmi.

Table 0.46: Bua numerals

	Fanya	Niellim	Tunya	Bua	Zan Gula	Kulaal (Gula)	Bolgo	Koke
1	do/lo	ɓúdū/ɓúrū	sèlì	gúlu	sammā, saado	ʈóŋ	ba(k)ra, silla	barak
2	i-ru/li-ru	ndīdí/ndīrí	à-rī	i-li/í-rī:	ɾis:i/lissi	rɔ̀k	lēti, retè	lēdi
3	taro	tērí	à-tā	í-tēr	to:ɾi	tòòs	teri	tēri
4	nagi/naro	niǎní/néni	à-nā	í-pāw/paõ	na:sɪ	nòrò̰	har	hār
5	lugni	lùní	à-lōnī	í-lwār	tɛ(r)	lúŋ	tisso	tisó
6	kaba	tá:r	nānò	tãr	5+1	lú-én-ʈóŋ	tipsi	dípsil
7	5+2	longa	lúlú	lür	5+2	lú-é-rɔ̀k	5+2	tiglén
8	<4	3+4', < Bagirmi	kɔ̀ntā̰	<* 4 PL?	5+3		orhor (4 redupl.), 5+3	4 redupl.
9	10-X	< Bagirmi	à-tī	lór-lor	5+4	sàkɔ́línnòrò̰	diar, 6+3	jār
10	teba	< Bagirmi, hulõa	kùtù	húlil/lor poo	filo:le/filori	yíppà	do(k)	dog
20	10*2	doksap	10*2	<10PL	ʊ-fa:lɛ		a-rep, a-hun, tehu	
100		ro/ru	à-rū	a-ru	< Arabic	míà/míè		ae léd
1000		dubu	dūbú	dubu	< Arabic	hálìf		ae har

Table 0.47: Bua numerals (summarized)

1	*do, *de?, bara(k), (ʈóŋ)	7	5+2, 3+4, lúlú/lòŋgɔ̄/lur, (tiglen)
2	*di, *ri?, *ru?, (rɔ̀k), (rete)	8	4 redupl., 5+3
3	tar/tori/teri	9	ti, jar, 5+4, 10-X
4	na/nagi/niani, har	10	do(k), (kùtù), (filo:le), (yíppà), (teba)
5	luni/loni/*lu,tɛ(r), *kɔn?, (tiso)	20	10*2, do-ksap, fa:lɛ, (a-rep), (a-hun)
6	5+1, tá:r, (nānò), (kaba), tipsi	100	ro/ru
		1000	< Bagirmi

0.5.4.3 Mbum (G6)

Table 0.48: Mbum numerals

1	mbew/mbiew, bɔ̄ɔ̄ŋ/búónó/bóm/vaŋno	7	10-3, rɪŋ, (rënām, tàrnáɡ̃à)
2	seɗe/sere, ɡwa/ɓɔ̀-gë, ɓà-tì	8	10-2, nama/namma/nènmàʔä
3	say	9	10-1, doraŋ
4	nìŋ, nai	10	boo, dʒama/dʒémà, (dùɔ, hù-wàlë)
5	ndiɓi/ndēɓē/dūwēe/dápɪ̀	20	10*2, '2 hands', 10+10
6	ze(y)/ye(a), (tɔ́tɔ́klɔ́, bì-gírò)	100	sɔ́ɗ/sɔt, < Fula, < Arabic
		1000	'sac', bag', < Fula, < Bagirmi

This sub-group is represented by a dozen languages. Unlike Leko-Duru-Mumue no alignment by analogy is attested. Some forms of 'two' are of unclear morphological structure.

0.5.4.4 Day

Table 0.49: Day numerals

1	ngɔ̄ŋ́, *mon	7	4+3
2	dīí	8	4 redupl.?
3	tà	9	'lacking one'
4	ndà, *bī-yām	10	mɔ̀
5	sɛ̄rì	20	10*2
6	5+1	100	tù
		1000	< Bagirmi

This branch is comprised of an isolated language. Its attribution to Mbum-Day has been a subject of scholarly debate. The form *mon '1' is postulated on the basis of sɛ̄rì mòn 'six', whereas the reconstruction of *bīyām (*bī-yām?) '4' is based on bīyām tà 'seven'.

0.5.5 Waja-Jen (G9, G10, G1, G7)

0.5.5.1 Jen (G9)

Table 0.50: Jen numerals

1	kwín/*ʃín/tsɨng	7	5+2
2	ráb/*re, bwə-ng, bwa-yung	8	4PL, 5+3
3	gbunuŋ, bwa-tə	9	5+4
4	net, bwa-nyə	10	ʃóób, bwa-hywə
5	nóob/*na, bwa-hmə/*hwĩ	20	fa-1, ngwu-1
6	5+1	100	20*5
		1000	ʃik-1, 20-fe

This branch is represented by two languages: Burak and Jenjo (Dza). The evidence from this group is among Boyd's best arguments for the reconstruction of **kwin* (< **ku-di-n*) 'one'. The primary term *li* (*bwa-li*) 'fifteen' is attested in Jenjo. Accordingly, the term for 'sixteen' follows the pattern '15+1' (*bwali ji tsɨng*). Interestingly, in Burak the term for 'hundred' is *li* (*li kwín*).

The form **hwĩ* 'five' is traceable in Jenjo compound terms covering the sequence from 'six' to 'nine' (*hwĩ-tsɨng* 'six', *hwĩ-yung* 'seven', etc.) as is the corresponding Burak form **na* 'five' (*naa-ʃín* 'six', *náá-re* 'seven', *ná-tát* 'eight'). The form **re* 'two' is observable in *náá-re* 'seven', whereas **ʃín* 'one' is traceable in *naa-ʃín* 'six'.

0.5.5.2 Longuda (G10)

The evidence for the first ten numerals in two Longuda dialects can be found in the table above (Table 0.36). The term for 'twenty' in these languages follows the pattern '10*2'. The forms of 'hundred' are *pùlò(wé)/phulewe*.

0.5.5.3 Waja (G1)

Some languages in this sub-group are characterized by a sub-morphological alignment of the terms for 'three' and 'four' well-attested in Adamawa: Dadiya *tal* '3' ~ *nal* '4', Bangunji (dial.) 1 *táát* '3' ~ *náát* '4', Bangunji (dial.) 2 *taar* '3' ~ *naar* '4', Tula (Kɨtule) *jí-t:à* '3' ~ *já:-nà* '4'. As a result, these terms are treated as minimal contrastive pairs in the paradigm. Within the NC context, forms with the final *-t* should be considered prototypical in the case of both terms. This means

Table 0.51: Waja numerals

1	w-in/d-in/kw-an/g-ɛɛn/*k-un?	7	ni-bir/ni-ber/ni-bil/ni-bi(y)
2	yɔ́-rɔ́b/rɔɔp/yob/yo, (su)	8	na-rib/na-lib/na-rub (4*2)
3	taat, kununŋ, (bwanbí)	9	10-1, teer/teet/tɔɔrɔ
4	naat, (gwár)	10	kɔ́b/kub/kwab/kpop/kwu
5	nu(ŋ), (fwáːd)	20	10*2, '2 hands'
6	nu-kun (<5+1?)	100	<10?, wɔn, (bwa-tigɛ)
		1000	kʊʊl, nèe/kú-néŋ, 100*10, bi-kate, tedu

that *naaX 'four' (final consonant unknown) may have evolved into *naat by analogy with 'three' in Proto-Waja. Later, an innovative form for 'three' developed in Awak and Waja: Awak *kunúŋ*, Waja *kunoŋ*. The Dijim-Bwilim *bwanbí* is apparently an innovation.

Interestingly, the froms for 'six' attested throuought the sub-group resemble the Awak and Waja forms for 'three'. At the same time, the forms for 'six' can be explained as '5+1' (assuming that they include an allomorph of *kun 'one').

0.5.5.4 Yungur (G7)

Table 0.52: Yungur numerals

1	fini/fandi/pə́ndə́ŋ (< *ndi?), wunú	7	nbutu
2	raap, fətə/fiicì (< *tə/ci?)	8	4 redupl.
3	táákə́n/(tɑɑrə́n)	9	5+4
4	kurun	10	bú(u), (kutun)
5	wonon/wonun	20	(10*2)
6	mindike	100	(-ru)
		1000	(100*10)

The terms for 'twenty', 'hundred' and 'thousand' are attested in only one source (Kaan (Libo)) out of the eight sources available for this branch, hence they are quoted in brackets. Morphological analysis of the terms for 'one' and 'two' is unclear: *fV may be a reflex of the original noun class prefix.

0.5.6 Laal

Finally, let us turn to the Laal numeral system. Laal's attribution to the Adamawa languages (as well as its attribution to NC) is debatable. Today it is assumed that it is an isolated case within Niger-Congo. Comparative study of its numerical terms may shed light on its genealogical relationship (Table 0.53).

Table 0.53: Numerals in Laal

1	ɓìdíl (ɓì-díl?)	7	5+2
2	ʔīsī (ʔī-sī?)	8	4 redupl.
3	māā	9	yàŋjáŋ
4	ɓīsān (ɓī-sān?)	10	tūū
5	sāb, *swa-	20	10*2
6	cìcààn	100	10-'big'
		1000	< Baguirmi < Hausa

As in many other NC languages, the major problem with Laal numerals is the obscurity of their morphological structure. Pascal Boyeldieu established that traces of noun class suffixes are observable in Laal forms as their comparison to sg and pl forms show (see **Boyeldieu1982**). At the same time, as I tried to demonstrate elsewhere (**Pozdniakov2010**), some traces of noun class prefixes had been preserved in this language as well. At this point, it seems reasonable to set the alternative variants aside for further comparison.

What follows is an attempt to synthesize the Adamawa evidence.

0.5.7 Proto-Adamawa

0.5.7.1 'One'

The main forms are given in Table 0.54.

In accordance with Boyd's hypotheses discussed above, the forms in the first two columns may be related in view of the reconstruction of the root *di* (possibly also *-in*), the noun class prefix *ku-* and the suffix *-n* (*ku-di-n* '1')

The last column lists forms that are attested in one of the branches only. The roots that can be tentatively reconstructed as *do*, *nga/ngɔ*, *(g)bunuand* and *mon* are noteworthy.

0.5.7.2 'Two'

The main forms of this root are quoted in Table 0.55. The grouping of forms is admittedly not substantiated enough. The variety of forms within this family is striking, even when unrestricted phonetic grouping is applied.

0.5.7.3 'Three'

Comparative evidence for this root points to its reconstruction as *taat* (with further alignment by analogy within each of the branches). As in the other NC families, the root is exceptionally stable, in contrast to the roots for 'one' and 'two' that demonstrate a wide variety of forms. A shared innovation in Jen and Waja (attested in Burak, Awak and Waja) is noteworthy.

Table 0.54: Adamawa stems for '1'

	'1'	'1'	'1'	'1'	'1'	'1'	'1'	'1'	'1'
Fali									
Kam	b-ịị								
Leko			*-lo						
Duru		dǝə		-(ŋ)gǎ/ -na? / *nge niŋa/ niíá (<ŋa?)	gbúnú	man(i)/*mal			
Leko									
Mumuye		ɓì-ntí/ɓi-ni (*< nti/ni?)							gbétè
Mbum									
Bua		*dɛ	*do				bara(k)		ţóŋ, *si?
Kim			dû				mbírâŋ		
Mbum						mōndā			mbew/ mbiew
Day			ngɔ́ŋ		bɔ̄ɔ́ŋ/ búónó	*mon			
Waja									
Jen	kw-in/ *ʃ-in/ ts-in̄g (< *in)								
Longuda	w-in/ d-in/ g-ɛɛn/ *k-un?								
Waja		fi-ni/ fa-ndí/ pə́-ndə̄ŋ (< *ndí?)							
Yungur					wunú				khal, twɛ̀
Laal		ɓìdíl (ɓì-díl?)							

Table 0.55: Adamawa stems for '2'

	'2'	'2'	'2'	'2'	'2'	'2'	'2'	'2'	'2'
Fali-Yingilum									
Kam	yi-raak (i-ra)								
Leko-Duru-Mumuye									
Duru	du/ ru, to		te/ re						
Leko	ra?	ii-/ in-?							
Mumuye		ye		ziti			nmú	nī	bwə-ng, bwa-yung
Mbum-Day									
Bua	*ru, (rɔk)	di/ ri		(rete) tʃɪrí					
Kim			zí						
Mbum			ɓà-tì	sede/sere	gwa/ɓɔ-gē				
Day		dīí							
Waja-Jen									
Jen	ráb/ *re,								
Longuda									
Waja	yɔ-rɔ́b/ rɔɔp/ yob/ yo			shir	kwɛ́	(su)			
Yungur	raap		fɨta/fiicì (< *tɨ/ ci?) ʔɪsì (ʔì-sì?)		gbara	cuk			
Laal									

Table 0.56: Adamawa stems for '3'

Fali-Yingilum	taan (< taaX)			
Kam	càr			
Leko-Duru-Mumuye				
Duru	tãátó/tããro			
Leko	toorà/toonú			
Mumuye	taat			
Mbum-Day				
Bua	tar/tori/teri			
Kim	tā			hā̰sī
Mbum	say			
Day	tà			
Waja-Ɉen				
Jen	bwa-tə	ɡbunuŋ		
Longuda	tsə́r		kwáí	
Waja	taat (bwanbí)	kunuŋ		
Yungur	táákə́n/(tɑɑrə́n)			
Laal				māā

0.5.7.4 'Four'

Table 0.57: Adamawa stems for '4'

Fali-Yingilum	naan				
Kam	nár				
	(< *naX)				
Leko-Duru-Mumuye					
Duru	nató/naró				
	(< *naX)				
Leko	naarà/nɛɛr-əb				
Mumuye	naat				
Mbum-Day					
Bua	na/nagi/niani			har	
Kim			ndà(y)		
Mbum	nai	nìŋ			
Day			ndà		*bī-yām
Waja-Ɉen					
Jen	net	bwa-nyə			
Longuda	nnyìr/nyìr				
Waja	naat			gwár	
Yungur					kurun
Laal					ɓīsān
					(ɓī-sān?)

The main NC form *na*X is predominant here, its second consonant being subject to alignment by analogy. The same root is likely to be reconstructed at the Proto-Adamawa level as well.

0.5.7.5 'Five'

The main root (*nun*) may be the same as in the Gur languages and may be etymologically related to the term for 'hand'. It is likely that the isolated forms quoted in the rightmost column go back to similar terms as well. The Jen root *hmə* could be a borrowing from Chadian Arabic: *xamsa* '5'. The Mbum forms *ndēɓē/ dūwēe* may be influenced by Fula (*jowi* 'five').

Table 0.58: Adamawa stems for '5'

Fali-Yingilum		kɛ̃rɛw		
Kam	ŋwún			
Leko-Duru-Mumuye				
Duru	núno/ nɔɔnɨ̀,			gbà náárò/ gbanáá, sáá
Leko	núúnà/ núnn-ub			
Mumuye	nɔng/ ghìnān			mǎ:ni
Mbum-Day				
Bua				luni/ loni/ *lu,tɛ(r), *kɔn?, (tiso)
Kim	nūwḛy		ndìyārá	
Mbum			ndiɓi/ dūwēe/ dápì	
Day				sērì
Waja-Ɉen				
Jen	nóob/ *na	-hmə/ *hwĩ		
Longuda	nyɔ́			
Waja	nu(ŋ)			fwá:d
Yungur	wo-non/ wo-nun			
Laal				sāb, *swa-

0.5.7.6 'Six'

Table 0.59: Adamawa stems and patterns for '6'

Fali-Yingilum			yira/yilo
Kam		jù:p	
Leko-Duru-Mumuye			
Duru	5+1	gúú	
Leko			nɔ̂ŋgɔ̂s/núŋgɔ́ɔs
Mumuye	5+1		
Mbum-Day			
Bua	5+1		tá:r, (nānò), (kaba), tipsi
Kim			māngùl/mènèngāl
Mbum			ze(y)/ye(a), tɔ́tɔ́klɔ́, bì-gírò
Day	5+1		
Waja-Ɉen			
Jen	5+1		
Longuda		tsàːtə̀n	2*3?
Waja	nu-kun (<5+1?)		
Yungur			mindike
Laal		cìcààn	

The most frequently attested pattern is '5+1'. At the same time, there is a great variety of isolated forms (see the last column). The similarity between the Laal and Longuda forms is noteworthy; both may go back to Chadian Arabic *sit:e* 'six'. The Kim (and also Yungur?) form could be a borrowing from Bagirmi (*mìká* '6').

0.5.7.7 'Seven'

As in the case of 'six', the predominant pattern ('5+2') for 'seven' is rather plain. It co-exists with a variety of isolated forms of uncertain etymology.

Table 0.60: Adamawa stems and patterns for '7'

Fali-Yingilum					jɔrɔs
Kam			'second six'		
Leko-Duru-Mumuye					
Duru	5+2	4+3	6+'odd'		gútambe, də́msàrà
Leko	5+2				
Mumuye	5+2				
Mbum-Day					
Bua	5+2	3+4			lúlú/lòŋgɔ̄/lur, (tiglen)
Kim				ɓēálā/ ɓēálār	dīyārā
Mbum					10-3, rɪŋ, rënām, tàrnɑ̃́gà
Day		4+3			
Waja-Ɉen					
Jen	5+2				
Longuda		4+3			
Waja				ni-bir/ -bil/-bi(y)	
Yungur					nbutu
Laal	5+2				

0.5.7.8 'Eight'

Table 0.61: Adamawa stems and patterns for '8'

Fali-Yingilum	4 redupl.			
Kam				sâl
Leko-Duru-Mumuye				
Duru	4PL/4+4	5+3		< Hausa
Leko		5+3		< Hausa
Mumuye		5+3		
Mbum-Day				
Bua	4redupl.	5+3		
Kim	ndāsì (4PL?)		wázìzí (10−2)	tīmāl
Mbum			10-2	nam(m)a/nènmà?ä
Day	4 redupl.?			
Waja-Ɉen				
Jen	4PL	5+3		
Longuda				nyíthìn
Waja	4*2			
Yungur	4 redupl.			
Laal	4 redupl.			

The pattern '8=4 redupl.' is to be reconstructed at the Proto-Adamawa level.

0.5.7.9 'Nine'

Table 0.62: Adamawa stems and patterns for '9'

Fali-Yingilum		10-1/ŋgʌs kàm(kàn) kpòlò 'rest hand one'	
Kam			níízaa
Leko-Duru-Mumuye			
Duru		'one finger is left', níǹsínè, 5+4, 10-1	
Leko	5+4	'one is left'	
Mumuye-Yandang	5+4		
Mbum-Day			
Bua	5+4	10-X	ti, jar
Kim		10-1	nòmīnā
Mbum		10-1	doraŋ
Day		'lacking one'	
Waja-Ɉen			
Jen	5+4		
Longuda	5+4		
Waja		10-1	teer/teet
Yungur	5+4		
Laal			yàŋjáŋ

A primary term for 'nine' was apparently non-existent in Proto-Adamawa. A comparison between Bua *diar* and Kanuri *ləɣár* may be suggestive if a borrowing is considered. The same applies to the terms for 'nine' in Waja (*tɔɔrɔ*) and Hausa (*tara*).

0.5.7.10 'Ten'

Two alternative roots for 'ten' (Table 0.63) are distinguishable (**boo* and **kob* attested in four and two groups respectively). The root *d(u)o* is observable in two Mbum-Day sub-groups. Finally, the root *kutu(n)* is found in two languages, namely in Tunya (Bua) and Kaan (Yungur). Assuming that *ku-* is a class prefix, this root may prove to be related to *tūū* (Laal).

Table 0.63: Adamawa stems for '10'

Fali-Yingilum						ra
Kam	bóò					
Leko-Duru-Mumuye						
Duru	bōʔ,	kob/				
		kop/				
		fób				
Leko		kób/				
		kóp				
Mumuye		kop/				
		kob				
Mbum-Day						
Bua			do(k)	kùtù		(filo:le),
						(yíppà),
						(teba)
Kim					wàl/	
					wòl/	
					wàr/	
					*wèy	
Mbum	boo		dùɔ		hù-	dʒama/
					wàlë	dʒémà
Day	mɔ̰̀					
Waja-Ɉen						
Jen		ʃóób				bwa-
						hywə
Longuda		koo/ kù				nɔ̂m
Waja		kɔ́b/				
		kub/				
		kwab/				
		kpop/				
		kwu				
Yungur	bú(u)			kutun		
Laal				tūū		

0.5.7.11 'Twenty'

The term for 'twenty' (Table 0.64) in the Duru languages either follows the pattern '20=10*2' or goes back to the lexical roots for 'head' and 'staff'. The Niellim term *do-ksap* was likely borrowed from Bagirmi *dùg sap* 'twenty'.

Table 0.64: Adamawa stems and patterns for '20'

Fali-Yingilum	10*2				
Kam					*ǹkpɔ́, kpáímí
Leko-Duru-Mumuye					
Duru	10*2		gbɛg/ gbàhsɨ́ ('staff'), *wɔ́ɔg ('head'), zul/ zur ('head')		ráárò, jùgúyɔ
Leko				laa-1	nɛd níi gbɛd
Mumuye					mba-1, kar-1, mim-1
Mbum-Day					
Bua	10*2			fa:lɛ	do-ksap, a-rep, a-hun
Kim	10*2				
Mbum	10*2	'2 hands', 10+10			
Day	10*2				
Waja-Ɉen					
Jen				fa-1	ngwu-1
Longuda	10*2				
Waja	10*2	2 hands'			
Yungur	10*2				
Laal	10*2				

0.5.7.12 'Hundred'

Table 0.65: Adamawa stems and patterns for '100'

Fali-Yingilum				< Fula
Kam	20*5			
Leko-Duru-Mumuye				
Duru	20*5			< Fula
Leko	20*5			< Fula
Mumuye	20*5			
Mbum-Day				
Bua			ro/ru	
Kim				< Arabic
Mbum		sɔɗ/sɔt		< Fula, < Arabic
Day		tù		
Waja-Jen				
Jen	20*5			
Longuda				pùlò(wé)/phulewé
Waja		<10?		wɔn, bwa-tigɛ
Yungur			(-ru)	
Laal	10-'big'			

The fact that this term was massively borrowed (most likely simultaneously) from Fula and Arabic suggests that it was lacking in Proto-Adamawa. It can be assumed that the root *ru* attested in Bua and Yungur is also a borrowing, this time from Bagirmi *àrú* 'hundred'.

0.5.7.13 'Thousand'

Table 0.66: Adamawa stems and patterns for '1000'

Fali-Yingilum		< Fula
Kam	?	
Leko-Duru-Mumuye		
Duru		< Fula, < Hausa
Leko	20*10?	< Fula
Mumuye	?	
Mbum-Day		
Bua		< Bagirmi
Kim		< Bagirmi
Mbum	'sack', bag'	< Fula, < Bagirmi
Day		< Bagirmi
Waja-Jen		
Jen	ʃik-1, 20-fe	
Longuda	?	
Waja	kʊʊl, nèe/kú-néŋ, 100*10, bi-kate, tedu	
Yungur	(100*10)	
Laal		< Baguirmi, < Hausa

The term for 'thousand' was massively borrowed from Fula, Bagirmi and Hausa, which points to its absence in the proto-language.

0.6 Ubangi

What follows is a preliminary analysis of the evidence of five separate language groups including Ubangi-Banda, Gbaya-Manza-Ngbaka, Ngbandi, Sere-Ngbaka-Mba (A. Ngbaka-Mba, B.Sere), and Zande.

0.6.1 Banda

Table 0.67: Numerals in Banda130

1	bàlē (bà-lē?)	7	5+2
2	biʃi (bi-ʃi?)	8	5+3, ngebeɗeɗe
3	vɔ-tɑ	9	5+4, 8+1
4	và-nā	10	mó-rófō, bu-fu, 'two hands ','all the fingers',*gba
5	mī-ndū	20	'one person', 'the whole person', 'body-person-all'
6	5+1, gɑzɑlɑ	100	ngàmbɔ̀/ngbàngbò,'five persons' , < Sango , < Lingala?
		1000	< French 'sack', < Lingala?

The form *gba* 'ten' is traceable in the Mbanza (Mabandja) terms for tens.

0.6.2 Gbaya–Manza–Ngbaka

Table 0.68: Numerals in Gbaya-Manza-Ngbaka

1	*kpɔ́k/kpóm ;ndáŋ	7	*5+2
2	*bùà, *ʃíítò; bùwá (bù-wá?)/vàχ, -too	8	*5+3; 4PL
3	*tàr(à)	9	*5+4;kùsì
4	*nár(á)	10	*ɓú/ɓú-kɔ̰́
5	*mɔ̀ɔ̀rɔ́/mɔ̀r-kɔ̰́	20	*10*2
6	*5+1, (gàzèlɛ̀)	100	*gɔ́m-màá ; < Lingala
		1000	< French 'sack', < Lingala

Ives Moñino's reconstructions (**Moñino1995**) are quoted in the table under an asterisk. Selected noteworthy forms are also included.

In the diachronical perspective, the forms *ʃíítò and *bùà 'two' probably included noun class prefixes. They go back to *-too and *-wa respectively (cf.*vàχ '2' in Gbaya Mbodomo).

In his discussion of *mɔ̀ɔ̀rɔ́ Moñino states that "La variante *mɔ̀ɔ̀rɔ́ semble être une contraction de *mɔ̀r-kɔ̰́, dans laquelle on peut reconnaître l'élément kɔ̰́ 'main' … " (**Moñino1995**). He also makes the following observation regarding the reconstruction of the term for 'ten': "*ɓú 'dix' est en relation avec *ɓú 'façonner, faire un cercle, joindre les mains'; la série partielle ɓú-kɔ̰́ est encore plus explicite, et décrit le geste qui accompagne l'énonciation du chiffre 10 chez tous les locuteurs" (**Moñino1995**)[7]. This is an important point, especially in view of the relatively frequent occurrence of *bu* in the NC languages and the possible etymological relationship between *ɓú and phonetically similar forms attested in other branches. However, such a relationship would be doubtful within Moñino's etymological hypothesis.

The following etymology is suggested for 'hundred' by Thomas Elvis Guenekean: "The word *gɔ̰̀m* means 'cut' or 'gathered' and *ñ̃m̃à:* means 'things'."[8] According to Moñino, the form literally means 'frapper-l'une l'autre (les mains)' (**Moñino1995**).

---

[7]However, in some Gbaya languages, these forms differ by tone: Gbaya (Roulon-Doko) ɓú '10' ~ ɓu 'to tap; to applaud, to roll'.

[8]https://mpi-lingweb.shh.mpg.de/numeral/Gbaya-Bossangoa.htm

0.6.3 Ngbandi

The Ngbandi and Yakoma evidence points toward the reconstruction outlined in the table below (Table 0.69):

Table 0.69: Numerals in Ngbandi

1	kɔ(i)	7	mbara-mbara
2	sɛ	8	miambe/myɔ̀mbè
3	ta	9	gumbaya
4	siɔ/syɔ	10	sui, bàlé
5	kɔ̃/kṹ	20	10*2
6	mana, mèrɛ̄	100	ngbangbo
		1000	< Lingala, Arabic

0.6.4 Sere-Ngbaka-Mba

Since the languages within this group are extremely divergent, it seems reasonable to treat the evidence from its two major sub-groups separately.

Ngbaka-Mba (Table 0.70)

Table 0.70: Numerals in Ngbaka-Mba

1	kpó-/kpáà-, ɓa-wɨ, ɓī-nì/bì-rì, ú-ma	7	5+2, (mā-nāníkà, lè-rɵzi, zyálá, sáɓá), sílànā/sélènā/ʃíēnā (<4?)
2	bɪ̄ʃ-ì/ɓī-sī, ɓi-né/bí-de, gbwɔ̀	8	sénā (2*4?), gba-dzena/mā-dʒénà, (5+3, 10-2)
3	ba-ta/ba-la	9	5+4, 10-1, (me-newá)
4	ba-na/ba-ɗa/ba-la	10	nzò kpā̰('head-hand')/àngbà, a-busa
5	bu-ruwe/bu-luve/θuwe, ʔeve/ve/vue	20	10*2
6	ʃí-tà/si-ta (2*3), mā-ɗíà/ká-zyá, 5+1	100	< Sango, < Lingala, 20*5, (mya, kʉ́lɔ́, kpode, ngūndāngū)
		1000	gyu, kutu, < Arabic, < French ('sack'), 100*10

Sere (Table 0.71)

Table 0.71: Numerals in Sere

1	njẽe	7	5+2
2	so	8	5+3
3	táʔò	9	5+4
4	nàʔò	10	ɓĩ̆-kürü , muʔɓì ('on hands')
5	vo	20	'kill-person-one'
6	5+1	100	'kill-persons-five', < Arabic
		1000	100*10

Sere-Ngbaka-Mba (Table 0.72)

Table 0.72: Sere-Ngbaka-Mba numeral system (*)

1	kí-lī, sa	7	5+2
2	ī-jō/ī-yō/úé	8	5+3
3	bíá-tá/ā-tā	9	5+4
4	lu, bīà-ngì ~ bīà-mà	10	ŋgbɔ̃̆/bà-wē
5	ì-sìbē/bī-sùè	20	'people one'
6	5+1	100	ndɔ̄ŋgbʉ́, ngbàngbù< Sango
		1000	sákì/sākè (< Sango < French)

0.6.5 Proto-Ubangi

The evidence pertaining to each of the numerical terms is summarized below.

0.6.5.1 'One'

Table 0.73: Ubangi stems for '1'

Banda	bàlē (bà-lē?)				
Gbaya-Manza-Ngbaka		kpɔ́(k)/ (kpém)	ndáŋ		
Ngbandi	kɔ(i)				
Sere-Ngbaka-Mba					
Ngbaka-Mba	ɓī-nì/ bì-rì	kpó-/ kpáà-			ɓa-wɨ́ú-ma
Sere				njẽe	
Zande	kí-lī				sa

Two competing roots (**le/ne* and **k(p)o(k)*) are distinguishable here.

0.6.5.2 'Two'

Table 0.74: Ubangi stems for '2'

Banda	biʃi (bi-ʃi?)			
Gbaya-Manza-Ngbaka		bùwá (bù-wá?)/vàχ	-too	
Ngbandi	sɛ			
Sere-Ngbaka-Mba				
Ngbaka-Mba	bī-ʃì/ɓī-sī	gbwɔ̀		ɓi-né/bí-de
Sere			so	
Zande				ī-jō/ī-yō/úé

The only root widely attested within this family is **si/ʃi*.

Table 0.75: Ubangi stems for '3' and '4'

	'3'	'4'	'4'
Banda	vɔ-tɑ	và-nā	
Gbaya-Manza-Ngbaka	tààr	náár	
Ngbandi	ta		siɔ/syɔ
Sere-Ngbaka-Mba			
Ngbaka-Mba	ba-ta/ba-la	ba-na/ba-ɗa/ba-la	
Sere	táʔò	nàʔò	
Zande	bíá-tá/ā-tā		lu, bīà-ngì ~ bīà-mà

0.6.5.3 'Three' and 'four'

The roots for 'three' and 'four' can be securely reconstructed as *taar* and *naar* respectively (with an alignment by analogy applied).

0.6.5.4 'Five'

Table 0.76: Ubangi stems for '5'

Banda	mī-ndū		
Gbaya-Manza-Ngbaka		mɔ̀r-(k)ɔ́	
Ngbandi		kɔ̃/kṵ̄	
Sere-Ngbaka-Mba			
Ngbaka-Mba	bu-ruwe/-luve/θuwe	ʔeve ~ ve/vue	
Sere		vo	
Zande			ì-sìbē/bī-sùè

    The Proto-Ubangi form is unclear, since the term for 'five' is based on the lexical root meaning 'hand' (*kɔ*) in two groups out of five. The only root whose attestations are not limited to a single group is *du(w)/lu(w)*.

0.6.5.5 'Six'

Table 0.77: Ubangi stems and patterns for '6'

Banda	5+1	ɡɑ-zɑlɑ	
Gbaya-Manza-Ngbaka	5+1	gà-zɛ̀lɛ̀	
Ngbandi			ma-na, mɛ̀-rɛ̄
Sere-Ngbaka-Mba			
Ngbaka-Mba	5+1	mā-ɗíà/ká-zyá	ʃí-tà/si-ta (2*3)
Sere	5+1		
Zande	5+1		

In addition to forms that follow the common pattern '6=5+1', a number of other forms of uncertain etymology are attested in the first two groups (and possibly in Sere-Ngbaka-Mba as well, assuming that our morphological analysis of pertinent forms is correct).

0.6.5.6 'Seven'

Table 0.78: Ubangi stems and patterns for '7'

Banda	5+2	
Gbaya-Manza-Ngbaka	5+2	
Ngbandi		mbara-mbara
Sere-Ngbaka-Mba		
Ngbaka-Mba	5+2	mā-nāníkà, lè-rɵzi, zyálá, sáɓá, sílànā/sélènā/ʃíēnā (<4?)
Sere	5+2	
Zande	5+2	

The variety of forms attested in Ngbaka-Mba is noteworthy.

0.6.5.7 'Eight'

Table 0.79: Ubangi stems and patterns for '8'

Banda	5+3		ngebeɗeɗe
Gbaya-Manza-Ngbaka	5+3	4PL	
Ngbandi			miambe/myɔ̀mbɛ̀
Sere-Ngbaka-Mba			
Ngbaka-Mba	5+3	sɛ́nā (2*4?)	ɠɓa-dzena/mā-dʒɛ́nà, 10-2
Sere	5+3		
Zande	5+3		

0.6.5.8 'Nine'

Table 0.80: Ubangi stems and patterns for '9'

Banda	5+4	8+1
Gbaya-Manza-Ngbaka	5+4	kùsì
Ngbandi		ɡumbaya
Sere-Ngbaka-Mba		
Ngbaka-Mba	5+4	10-1, (me-newá)
Sere	5+4	
Zande	5+4	

Apparently, at the family level the common pattern '5+' should be assumed for the terms from 'six' to 'nine'. Isolated forms attested in groups and sub-groups are quoted here (as well as in the cases of other families) in order to collect exhaustive evidence for further etymological analysis. Moreover, a small chance that the Niger-Congo proto-form is traceable within only a single branch should not be ignored.

0.6.5.9 3.7.5.9. 'Ten'

The reconstruction of the term for 'ten' is so problematic that it raises doubts as to whether it was present in Proto-Ubangi at all. In view of the convincing internal etymology suggested by Ives Moñino, the root **bu* alternating with **pu*

Table 0.81: Ubangi stems for '10'

Banda	bu-fu	*gba	mó-rófō, ' two hands', 'all the fingers'
Gbaya-Manza-Ngbaka	'personne' ('joindre les mains')		
Ngbandi			sui, bàlé
Sere-Ngbaka-Mba			
Ngbaka-Mba		nzò-kpā 'head'-'hand')/à-ngbà	a-busa
Sere			ɓĩ̀-kürü, 'on hands'
Zande		ŋgbɔ̃́/bà-wē	

and **fu* in some of the NC families is an unlikely candidate. The reconstruction of **gba/ kpa* is worth considering. However, the root may not be primary.

0.6.5.10 'Twenty'

Table 0.82: Ubangi stems and patterns for '20'

Banda	'one person', 'the whole person', 'body-person-all'	
Gbaya-Manza-Ngbaka		10*2
Ngbandi		10*2
Sere-Ngbaka-Mba		
Ngbaka-Mba		10*2
Sere	'kill-person-one'	
Zande	'people one'	

Two reconstruction possibilities are available here, i.e. the pattern '20=10*2' commonly attested in NC, and a derivation from the lexical term meaning 'person'.

Table 0.83: Ubangi stems and patterns for '100'

Banda	ngàmbɔ̀/ngbàngbò	'five persons'< Sango, < Bangala (< Lingala?)
Gbaya-Manza-Ngbaka		'cut/gathered'-'things'? 'clap hands'?, < Lingala
Ngbandi	ngbangbo	
Sere-Ngbaka-Mba		
Ngbaka-Mba		< Sango, < Lingala, 20*5, (mya, kúlɔ́, kpode, ngūndāngū)
Sere		'kill-persons-five', < Arabic
Zande	ngbàngbù < Sango	ˈndɔŋɓú

0.6.5.11 'Hundred'

Most of the forms are apparent borrowings which suggests that the term for 'hundred' was absent in Proto-Ubangi.

0.6.5.12 'Thousand'

Table 0.84: Ubangi stems and patterns for '1000'

Banda	< French, < Lingala?	
Gbaya-Manza-Ngbaka	< French, < Lingala, tɔ́maỳ	
Ngbandi	< Lingala, < Arabic	
Sere-Ngbaka-Mba		
Ngbaka-Mba	< Lingala, < Arabic, < French, 100*10	gyu
Sere	1000*10	
Zande	< Sango < French	

The absence of the term for 'thousand' in Proto-Ubangi is even more evident than the absence of the term for 'hundred.'

0.7 Dogon and Bangime

A step-by-step reconstruction of Dogon numerals does not seem reasonable because the family is relatively homogeneous. In addition, the formal differences between the numerical terms do not seem to correlate with the internal genealogical classification of the Dogon languages. The table below offers an overview of the pertinent data (Table 0.85) and is followed by a brief commentary.

Table 0.85: Dogon numerals

1	túrú/tumɔ, ti(i)	7	suli/soli/soye
2	lɛ́(y)/lɔ́(y)/nɛ́(y)/nɔ́(y)	8	gá(a)rà, sagi, sele (< Mande?)
3	taan	9	túwɔ́
4	nay(n), kɛɛso	10	pɛ́rú/pɛ́lú
5	núnɛ́ɛ́(n)/nǔː(yn)/nûm	20	10*2
6	kuro/kule	100	80 (síìŋ/súŋ) +20, < Fula
		1000	800 (múɲú) +200

'One': Najamba-Kindige: *kúndé* '1', Mombo *yɛ̀ːtáːŋgù* '1'.

'Two': The forms with the nasal **n-** attested in several dialects are variants of the basic form with ***l-**. It should be noted that the final palatal element is systematically attested in other numerical terms, e.g. in Ben Tey (Table 0.86):

Table 0.86: Final palatal in '2'

2	yěy	6	kúròy
4	nǐːy^n	7	súy^{n}ɔ̀y^n
5	nùmǔy^n	8	gá:rày

Regardless of whether this element is a morpheme or not, we are certainly dealing with a phonetic alignment by the final segment. Thus the final -**y** should not be reconstructed even in those forms that show its presence in the majority of languages.

'Three': This is a persistent form with only minor modifications applied to it (e.g. *taandu*, *taali*).

'Four': This is the only term for which the final palatal (probably nasalized) is potentially reconstructable. If so, systematic alignments by analogy attested in final segments of other numerals are probably based on the form of 'four'. The

root *kɛɛso/ kɛ́ːjɔ́/ kɛ́ːjɛ̀y/ cɛ́zɔ̀/ yè-cɛ́zɔ́* is probably an innovation (see, however, Jeff Heath who argues for its archaic nature[9]). The term may be etymologically connected to the term for 'eighty', cf. Najamba-Kindige *sîm*, *kɛ̀ːsŭm*, Tommo So *kɛ̀ɛ̀súm* and a number of other related forms (Yorno So *dɔ̀gɔ̀-sŭm*'80', "Dogon hundred", Valentin Vydrin, p.c., Perge Tegu *dɔ̀gɔ̀-sŭŋ* '80', Yanda Dom *sìŋ* '80' etc.).

'Five': The etymological connection of this term with the lexical root meaning 'hand' *nùmà/ nùmó/ nùmɔ́/ nŏỹ* is immediately apparent.

'Six' and 'seven' are probably primary terms.

'Eight'. The root *sagi* attested in Najamba and Yanda Dom was probably borrowed from Mande. The forms *sila, seele* observable in a number of dialects may be related to it. The root *gá(a)rà* is commonly attested in the majority of languages of this group, sometimes with a partial reduplication (Donno So/Yorno So/Toro So *ga-gara/ga-gira*). Partial reduplication is a popular means of deriving 'eight' from 'four' commonly attested throughout NC. In view of the fact that the Dogon counting system is based on 8, this root should probably be compared to *gàrá,* meaning 'big, large, a large quantity, a lot, go beyond (limit), more, to a greater extent'. Tonal differences may be neglected in this case, especially since the derived forms tend to be formally marked, e.g. tonally.

'Hundred'. The basic 'large number' in Dogon is 'eighty' rather than 'hundred', so this meaning should probably be reconstructed for *siiŋ/suŋ.* In view of this, the fact that the term for 'hundred' was borrowed from Fula in nearly all Dogon languages is not a coincidence.

'Thousand'. Similarly, the root *muɲu* (var. *mùsú / mùdʒú*) '800' incorporated into the pattern '1000=800+200' is reconstructed in Dogon.

The Bangime numeral system should also be considered here, since most of the numerical terms attested in this isolated language are comparable to those found in Dogon (Table 0.87).

As in Dogon, the terms covering the sequence from 'six' to 'nine' are primary. An isolated root for 'forty' (also represented in some of the Dogon languages) is attested in Bangime. Interestingly, the root is the same as the one found in some of the Mande languages, cf. Bangime *dɛ̀vɛ́*, Dogulu Dom (Dogon) *dɛ̀ɛ́*, Mombo (Dogon) *dêː*, Marka Dafing *dɛbɛ*, Bozo *dɛ̀bɛ́/ lɛ́wɛ̀*, Bamana *dɛ̀bɛ́*.

The root for 'ten' does not correspond to the one attested in Dogon. The latter finds a direct parallel in Boko (East Mande *kuri* 'ten'.

---

[9]http://dogonlanguages.org/

Table 0.87: Bangime numerals

1	tòré/tĭyɛ́ (in counting)	7	kĭjé
2	jíndò	8	sàágín (< Mande?)
3	táárù	9	tɛ́gò
4	nìjɛ́	10	kúrɛ́
5	nŭndí	20	tàáw̃á
6	kĕré	100	tɛ̀ɛ̀mɛ̀dɛ́rɛ́ (< Fula)
		1000	mŭʒú

0.8 Gur

It should be noted that the Gur languages are extremely divergent in the majority of their numerical terms (including those that prove to be fairly persistent in other families). The approach we took for the evidence studied above (i.e. the establishing of the most common forms and their further comparison to the data from other branches) may not appear fruitful in the case of the Gur languages.

To deal with the problem, we are going to use the classification of the Gur languages found in *Ethnolog*, namely A. Bariba, B. Central, C. Kulango, D. Lobi, E. Senufo, F. Teen, G. Tiefo, H. Tusia, I. Viemo, J. Wara-Natioro[10] . The Gur family comprises nearly a hundred languages. In terms of the classification outlined above, their distribution is uneven. Seven groups (Bariba, Kulango, Lobi, Teen, Tiefo, Tusia, Viemo) have an isolated language as their only member. Similarly, Wara-Natioro is represented by only three idioms. This means that the majority of the Gur languages are split between the two remaining groups, i.e. Senufo and Central. The former is comprised of about fifteen languages and is relatively homogenous. Its affiliation to Gur is often considered doubtful. Compared to Central, which embraces the majority of the Gur languages (nearly seventy), this group is relatively small. Two major sub-groups are identifiable within Central, i.e. Northern (38 languages) with Oti-Volta (33 languages) as the dominant branch and Southern (31 languages) with its dominant branch of Grusi (23 languages). In other words, 71 of the Gur languages (out of a total of 91) belong to either Oti-Volta, Grusi or Senufo. In addition to that, there are more than ten branches represented by a single isolated language each. No evidence points to their possible affiliation with the major branches or to their inter-relationship.

---

[10]This classification is accepted here with slight modifications based on recent studies. For instance, Dyan and Lobi are treated as members of the same branch.

The same can probably be said about several isolated languages affiliated (often uncritically) with the Central group (the Bwamu, Kurumfe, Dogoso-Khe, Gan-Dogosé, and Kirma-Tyurama branches). This already complex picture gets even more sophisticated in view of the following:

1) Branches represented by one or two languages (e.g. Buli-Konni, Notre, Yom-Nawdm) are distinguishable even within the most reliably established bodies of genetically related languages of this family.

2) According to Ulrich Kleinewillinghöfer (p.c.), who is a renowned expert in both Gur and Adamawa comparative linguistics, a border between these two families is not clear at all. This means that some of the Gur branches may prove to be more closely related to Adamawa.

Our reconstruction of the Gur numeral system is based on nearly 120 sources that vary in regards to the evidence they offer (cf. our considerations above). By addressing one of the most problematic cases (i.e. the reconstruction of the Gur term for 'one') we hope to work out a general approach that will eventually allow further comparison of the Gur evidence to that of other NC families.

'One'

The table below lists several forms of the term for 'one' in smaller Gur branches (Table 0.88):

Table 0.88: Diversity of stems for '1' in Gur

Gurma	Grusi-Eastern	Grusi-Western
Akaselem: m̀-bá	Bago-Kusuntu: ŋʊɾʊkpákpá	Chakali: dígímáná
Bimoba: yènn	Chala: -re-, -dʊ́ndʊlɔŋ	Deg: beŋ-kpaŋ/kpee
Miyobe: n-ni (-sɛ)	Delo: daale	Phuie: déò/dùdúmí
Nateni: -cɔ̃, dèn	Kabiye: kʊ́-yʊ́m	Sisaala: kʊ̀-bàlá/dìáŋ
Ngangam: mi-kpìɛkm	Lama: kó-ɖə́m	Winyé: n-do

A brief study of these examples raises doubts as to whether the Gur numeral system is reconstructable at all (not to mention the Grusi-Northern system or those of the more isolated Gur branches).

Even if we consider one syllable roots of the CV(C)-type only, the impression will remain that every concievable root for 'one' is attested in the Gur languages. At the same time, none of these roots is traceable in at least half of the Gur groups. This situation is reflected in the matrix below (Table 0.89).

Table 0.89: Distribution of the CV(C)- forms for '1' in the Gur languages

	I	A	U
P (p/f)	–	–	–
B (b/w/m)	3/5	1/4	1/1?
T (t)	1/1	2/2	–
D (d/l/r/n)	3/16	–	3/13
C (c/s)	–	–	1/1
J (j/y/ny)	1/18	1/1	1/1
K (k/h/x)	2/5	1/2	2/4
G (g/ŋ)	1/5	1/1	1/1

The first figure refers to the number of groups where a form is attested (with a maximum of 10 groups), whereas the second one refers to the number of languages. Thus, **B-I** denotes a form comprising a voiced labial consonant (b, w or m) and a front vowel that is attested in five languages within three groups (Central, Lobi-Dyan and Senufo) (Table 0.90):

Table 0.90: BI- forms for '1' in Gur (3 groups, 5 languages)

béé	Ditammari	B. Central	1. Northern	C. Oti-Volta	ii. Eastern
bìè-	Lobi	D. Lobi-Dyan			
bȅg	Dyan	D. Lobi-Dyan			
nì-bín	Cebaara	E. Senufo			
nan-bin	Shempire	E. Senufo			

The remaining forms are quoted below as an illustration of their extreme divergency.

(1) **BA** (1/4) (Table 0.91):

Table 0.91: BA- forms for '1' in Gur (1 group, 4 languages)

M̀-bá	Akaselem	B. Central	1. Northern	C. Oti-Volta	Gurma
bàa	Konkomba	B. Central	1. Northern	C. Oti-Volta	Gurma
mi-ba	Ngangam	B. Central	1. Northern	C. Oti-Volta	Gurma
ǹ.-bá /-bɔ́	Ntcham	B. Central	1. Northern	C. Oti-Volta	Gurma

BU (1/1): only *pú-wò* (possibly *púw-ò*, **PU?**) in Wara (J.Wara-Natioro)
TI (1/1): only *tía* in Baatonum (A.Bariba)
TA (2/2) (Table 0.92).

Table 0.92: TA- forms for '1' in Gur

ta, taà, tãà̃	Kulango (dial.)	C.Kulango
tani	Teen (dial.)	F.Teen

DI (3/15) (Table 0.93):

Table 0.93: DI- forms for '1' in Gur

dè	Bwamu (Boore)	B. Central	1. Northern	A. Bwamu	
nni	Miyobe	B. Central	1. Northern	C. Oti-Volta	iii. Gurma
dèn	Nateni	B. Central	1. Northern	C. Oti-Volta	iii. Gurma
lé	Khe Southern	B. Central	2. Southern	A. Dogoso-Khe	
í-lèŋ	Khisa	B. Central	2. Southern	C. Gan-Dogose	
re-	Chala	B. Central	2. Southern	D. Grusi	i. Eastern
dííŋ	Paasaal	B. Central	2. Southern	D. Grusi	iii. Western
déò	Phuie	B. Central	2. Southern	D. Grusi	iii. Western
dìáŋ	Sisaala (dial.)	B. Central	2. Southern	D. Grusi	iii. Western
dìén	Sisaala (dial.)	B. Central	2. Southern	D. Grusi	iii. Western
diigɛ	Tampulma	B. Central	2. Southern	D. Grusi	iii. Western
déiŋ	Kirma	B. Central	2. Southern	E. Kirma-Tyurama	
dẽẽn-	Turka	B. Central	2. Southern	E. Kirma-Tyurama	
nò-ni	Karaboro (dial.)	E. Senufo			
dɛ̀	Tiefo (dial.)	G. Tiefo			

DU (3/13) (Table 0.94)

Table 0.94: DU- forms for '1' in Gur

dòǔ	Bwamu	B. Central	1. Northern	A. Bwamu	
dòòn	Bwamu	B. Central	1. Northern	A. Bwamu	
dò	Láá Láá	B. Central	1. Northern	A. Bwamu	
rʊ	Chala	B. Central	2. Southern	D. Grusi	i. Eastern
kà-lò̀	Kasem (dial.)1	B. Central	2. Southern	D. Grusi	ii. Northern
kà-lʊ	Kasem (dial.)2	B. Central	2. Southern	D. Grusi	ii. Northern
è-dù	Lyele	B. Central	2. Southern	D. Grusi	ii. Northern
ù-dù	Northern Nuni	B. Central	2. Southern	D. Grusi	ii. Northern
nò-dò̀	Southern Nuni	B. Central	2. Southern	D. Grusi	ii. Northern
n-do	Winyé	B. Central	2. Southern	D. Grusi	iii. Western
nú-nu	Nafaanra	E. Senufo			
dũde	Viemo	I.Viemo			

CU (1/2): only *mà-cɔ́* in Nateni (Central: 1. Northern: C.Oti-Volta: iii. Gurma
JI (1/19) (Table 0.95)

Table 0.95: CI- forms for '1' in Gur

yéŋ/ wà-ɲī	Buli	B. Central	1. Northern	C. Oti-Volta	i. Buli-Koma
yɛ̃n	Mbelime	B. Central	1. Northern	C. Oti-Volta	ii. Eastern
yènn	Bimoba	B. Central	1. Northern	C. Oti-Volta	iii. Gurma
yèn-	Gurma	B. Central	1. Northern	C. Oti-Volta	iii. Gurma
jènǹ	Moba	B. Central	1. Northern	C. Oti-Volta	iii. Gurma
bõ-ɣén	Birifor (dial.)	B. Central	1. Northern	C. Oti-Volta	iv. Western
bo-yæn	Birifor (dial.)	B. Central	1. Northern	C. Oti-Volta	iv. Western
bõ-yen	Dagaara (dial.)	B. Central	1. Northern	C. Oti-Volta	iv. Western
yén-	Dagaara (dial.)	B. Central	1. Northern	C. Oti-Volta	iv. Western
yén	Farefare	B. Central	1. Northern	C. Oti-Volta	iv. Western
yé	Moore	B. Central	1. Northern	C. Oti-Volta	iv. Western
bǒ-ŋjìŋ	Wali	B. Central	1. Northern	C. Oti-Volta	iv. Western
yín	Dagbani (Dagomba)	B. Central	1. Northern	C. Oti-Volta	iv. Western
yɪn-	Hanga	B. Central	1. Northern	C. Oti-Volta	iv. Western
yín	Kamara	B. Central	1. Northern	C. Oti-Volta	iv. Western
yén-	Kantosi	B. Central	1. Northern	C. Oti-Volta	iv. Western
yín	Mampruli	B. Central	1. Northern	C. Oti-Volta	iv. Western
nyǒŋ	Yom (Pila)	B. Central	1. Northern	C. Oti-Volta	v. Yom-Nawdm

JA (1/1) – only *à-yàʔ* in Safaliba (B. Central: 1. Northern: C.Oti-Volta: iv. Western)
JU (1/1) – only *yòn* in Waama (B. Central: 1. Northern: C.Oti-Volta: ii. Eastern)
KI (2/5) (Table 0.96)

Table 0.96: KI- forms for '1' in Gur

m̀-hén	Nawdm	B. Central	1. Northern	C. Oti-Volta	v. Yom-Nawdm
kpee	Deg	B. Central	2. Southern	D. Grusi	iii. Western
kpéé	Vagla	B. Central	2. Southern	D. Grusi	iii. Western
nì-kì̀	Sìcìté Senufo	E. Senufo			
nìŋ-kìn	Supyire Senufo	E. Senufo			

KA (1/2) (Table 0.97)

Table 0.97: KA- forms for '1' in Gur

beŋ-kpaŋ	Deg		B. Central	2. Southern	D. Grusi	iii. Western
kpáŋ	Vagla		B. Central	2. Southern	D. Grusi	iii. Western

KU (2/3) (Table 0.98)

Table 0.98: KU- forms for '1' in Gur

kpò	Khe (dial.)	B. Central	2. Southern	A. Dogoso-Khe
tì-kpóʔ	Dogose	B. Central	2. Southern	C. Gan-Dogose
tʰi-kpo	Kaansá	B. Central	2. Southern	C. Gan-Dogose
nú-kú	Toussian (dial.)	H. Tusia		

GI (1/5) (Table 0.99)

Table 0.99: GI- forms for '1' in Gur

niŋ-gbe	Palaka Senufo	E. Senufo
nī-gbe	Nyarafolo Senufo	E. Senufo
ni-gì/ni-gĩ	Mamara Senufo (Minyanka)	E. Senufo
nin-gin	Shempire Senufo	E. Senufo
nu-gbe	Tagwana Senufo	E. Senufo

GA (1/1) – only *nuŋ-gba* in Djimini Senufo (E. Senufo).
GU (1/1) – only *gbú* in Northern Khe (B. Central: 2. Southern: A. Dogoso-Khe).

The only lacuna in this presentation is due to the lack of forms with voiceless labial consonants (this, however, may not prove true in the case of Wara-Natioro, as we hope to demonstrate below). It should be noted that the general distribution pattern is that a single form is attested in one branch out of ten, three forms are found in both two and three branches, and none of the forms is recorded in four or more branches. This makes an attempt at tracing them down to a source form (with its further comparison to the evidence of the other families) unreasonable. In view of the genetic classification of the Gur languages and the considerations presented above, the optimum solution to the problem probably lies within separate reconstructions of numerals in the following sixteen Gur branches that belong to ten major language groups of this family, assuming that each of them may shed some new light on the reconstruction of the Niger-Congo numeral system:

1. Bariba
2. Central: 1. Northern: A. Bwamu
2. Central: 1. Northern: B. Kurumfe
2. Central: 1. Northern: C. Oti-Volta
2. Central: 2. Southern: A. Dogoso-Khe
2. Central: 2. Southern: C. Gan-Dogose
2. Central: 2. Southern: D. Grusi
2. Central: 2. Southern: E. Kirma-Tyurama
3. Kulango
4. Lobi-Dyan

5. Senufo
6. Teen
7. Tiefo
8. Tusia
9. Viemo
10. Wara-Natioro.

Numerical terms as attested in each of these branches will be examined below.

0.8.1 Bariba

Table 0.100: Bariba numerals

1	tiā	7	5+2
2	ru	8	5+3
3	i-ta	9	5+4
4	ǹ-nɛ	10	wɔ-kuru
5	nɔ̀ɔbù	20	yɛndu
6	5+1	100	20*5
		1000	fɔ̀rɔ̀tɔ?

0.8.2 Central Gur

0.8.2.1 Northern Central Gur

0.8.2.1.1 Bwamu

Table 0.101: Bwamu numerals

1	do	7	5+2
2	ɲū	8	5+3
3	tĩ	9	dìiní/dènú
4	náa	10	pílú/píru/ˀɓúrúù
5	hò-nú	20	ɓóní/ɓénle/kēwēníì
6	5+1	100	kʰĩ̃minù (< Mande keme)
		1000	100*10, muaseé

0.8.2.1.2 Kurumfe

Table 0.102: Kurumfe numerals

1	dom	7	pɛ̃ɛ̃
2	hĩĩ	8	tɔɔ
3	tãã	9	fa
4	nãã	10	fɪ
5	nɔm	20	sofe (<10?)
6	hʊrʊ	100	bɛrʊ
		1000	tʊsrɪ < from Moore

0.8.2.1.3 Oti-Volta

Table 0.103: Buli-Koma numerals

1	yéŋ (adj.), ní (count)	7	yòpɔ̄āī, pő̀ì̂
2	yè, li	8	nāāniŋ/à-níì (<* 4redupl., 4PL?)
3	tà	9	nèūk/ŋ̀wɛ́
4	nààsì/nísà	10	pī/bâŋ
5	nù	20	10*2
6	yùèbì/óbìŋ	100	kòòk, kobɪga/bóɾà
		1000	< Engl.

i. Buli-Koma (Table 0.103)

Table 0.104: Eastern Oti-Volta numerals

1	cɔ̄rɔ̄, béé, dèǹnì (counting), yẽnde/yòn, *de	7	pèléī/bérén, yīēkà/nyiekɛ, doodɛ̄ (6+1)
2	dyā, dɛ́ɛ́, diání/dɛɛni, yēdē/yɛ́ndí	8	nēī/nɛ̀í/ni/ninyɛ̄̃
3	tâati/tâadi/tāārī	9	wáī/wɛi/wɛ̄
4	naa(si)	10	pwígɔ̄/pííkà/piíkɛ/piitɛ , *pi
5	num(mu)/nun	20	10*2
6	kūà/kuɔ, dūo, hã̀dwàm, kpàrùn	100	kòɣɔ̄/kookɛ/kɔ́úkpà/kɔ̀ɔ̀tà
		1000	túsírè

ii. Eastern (Table 0.104) Please note the extreme divergency of languages within this branch: the variety of forms presented in the table above are attested in only four languages, i.e. Biali, Ditammari, Mbelime and Waama.

Table 0.105: Gurma numerals

1	bá, yènn(do), den (isol.: ni, cɔ̃)	7	lòlé/lèlé (isol.: sɛ́ɛi, yehì)
2	le/dɛ́/tɛ́	8	ni(n)
3	tà	9	wɛ̀ʔ/wɛ́ɛ/wɔ́ì/wáī
4	nà(hì)	10	píík/pʷíʔ/fi/pita
5	mù/nùm̀/nu(pũ)/ŋùn	20	10*2 (isol.: kòó, mùŋ̀kú < mande?)
6	loòb/luu, kɔ̀dì/kouulɯ̆́	100	kúb (isol.: pílɛ, kɔ̀ta)
		1000	< kùtùkúʿsack', borrowing

iii. Gurma (Table 0.105)

Table 0.106: Western Oti-Volta numerals

1	yen/yin, dam?, (dàkɵ̋ʔ)	7	yopoi (< yo-poi?)
2	yi(ʔ)	8	nii(n)
3	ta	9	way/wey
4	naasi/naar/nãan	10	pia/pie
5	nú	20	10*2
6	yobu	100	kob/kɔɔ
		1000	tur/tudi (borrowed?)

iv. Western (Table 0.106)

Table 0.107: Yom-Nawdm numerals

1	hén, nyɵ̆ŋ- /nyɵ̆rɣə-	7	lèbléʔ (<6?), 5+2
2	li/ɾéʔ/*rɣa?	8	nì:ndí; 10-2
3	ta/tâʔ	9	wɛ́ʔ, 10-1
4	naa/nɛ̀ɛ̀sə̀	10	ʔɾíʔ, fɛɣa
5	nu	20	2PL
6	m̀ɾò:ndí (X+1?), lèèwɛ̀r	100	lémú, wʊr-

v. Yom-Nawdm (Table 0.107)

Proto-Oti-Volta The evidence of five Oti-Volta branches (isolated forms excluded) is summarized in Table 0.108.

Table 0.108: Numerals in Proto-Oti-Volta

	i. Buli-Koma	ii. Eastern	iii. Gurma	iv. Western	v. Yom-Nawdm	*Proto-Oti-Volta
1	yéŋ, ní	dènnì, yɛ̃nde/ yòn, *de	yènn(do), den, ni	yen/ yin, dam	hén, nyǎŋ	den/ yen, ni, de?
2	yɛ̀, li	dɛ́ɛ́(ni), yᵉēdē	le/ dɛ́	yi(ʔ)	li/ ɾé?/ *rɣa?	li/ yi
3	tà	tâati	tà	ta	ta	ta(t)
4	nààsì	naa(si)	nà(hì)	naasi	naa/ nɛ̀ɛ̀sə̀	naa(si)
5	nù	nun	nùm̀/ nu/ ŋùn	nú	nu	nu
6	yùèbì/ óbìŋ	dūo	loòb/ luu	yobu	lèèw-ə̀r	lob/ yob
7	yòpɔ̄āī, pɔ́ì̃	doodɛ̄ (6+1)	lòlé/ lèlé	yopoi	lèblé?	*lob-le (6+1)? poi(n)?
8	nāāniŋ/ à-níì	nɛ̃́í/ ni/ ninyɛ̃̄	ni(n)	nii(n)	nì:ndí	ni
9	nèūk/ ŋ̀wɛ́	wáī/ wɛi/ wɛ̄	wè?/ wɛɛ/ wáī	way/ wey	wɛ́ʔ	wey/ we?
10	pī	pwígə̄/ pííkà/ *pi	píík/ pʷíʔ/ fi	pia/ pie	fɛɣa	pi(k)
20	10*2	10*2	10*2	10*2	2PL	10*2
100	kòòk, kobɪga	kòɣə̄/ kookɛ/ kɔ́úkpà	kúb	kob/ kɔɔ	lɛ́mú, wʊr-	kob, kook

The reconstruction of the Oti-Volta numeral system is surprisingly unproblematic. In addition to the expectedly persistent reflexes of 'three' and 'four', homogeneous forms for 'two', 'five', and 'ten' are noteworthy. The term for 'eight' seems to be based on 'four' (either via the partial reduplication or according to the '4PL' pattern). In addition to that, Oti-Volta is characterized by the presence of the primary (homogeneous) forms of 'six', 'eight', and 'nine'. The forms of 'seven' are probably derived and follow the pattern '6+1'. It appears that the derivative form *lob-le > lole is already reconstructable at the Proto-Oti-Volta level.

0.8.2.2 Southern Central Gur

0.8.2.2.1 Dogoso-Khe

Table 0.109: Dogoso-Khe numerals

1	kpò, lé	7	5+2
2	jɔ(n)	8	5+3
3	thɔ	9	5+4
4	dáa	10	kpélé
5	nɔ(n)	20	cúkúrì/gʊ̀ʊsì
6	5+1	100	20*5
		1000	kpɛ́

The forms pertaining to these languages that are not present in the main databases are quoted according to Kerstin Winkellmann in (Miehe; Reineke; **Winkelmann2007** 181-210). Although the numerals attested within the two languages of this group are quite persistent, Kerstin Winkellmann stresses their grammatical difference: "... while Dɔgɔ-sʊ uses noun suffixes, sʊ-Khe is a prefixing language " (Winkellmann 2007d: 209).

0.8.2.2.2 Gan-Dogose

Table 0.110: Gan-Dogose numerals

1	kpo/po, (lèŋ)	7	5+2
2	yɔ́/ɲɔ/ʤɔ̀ŋ	8	5+3
3	sá̰a/tʰɔ̀ʔ	9	5+4, 10-1
4	ɲee/ì-yìi̯, (á-dàa)	10	(kpoogo, gbùnè, kpélé, sí-nõy - 5PL)
5	mwã/wàa, nɔ̀n	20	gbeere, (tʃúkúrì)
6	5+1	100	20*5
		1000	kpíɛ 'a goat'

Three of the languages belonging to this branch show too many forms, suggesting that we are dealing with a heterogeneous branch. In view of its numerical terms, it is not immediately apparent why this branch has been singled out.

0.8.2.2.3 Grusi

Table 0.111: Eastern Grusi numerals (*)

1	ḍɔ́m/lɔ̀m/yɔ́m, re/ɔ́ḍe	7	lʊbɛ, 6+1, 4+3, 10-3
2	la/lɛ̀	8	4redupl., 4PL, 10-2, toozo, (k͡pèèrè)
3	tòòsó/tooro	9	10-1, isolated forms
4	násá/naara	10	fu, (nɔ̆á - 5PL, sàlá)
5	nʊ̆/nʊ̆ŋ, kpásì/gbɑ̃́nzì	20	ko/kuo/koowu, (sao, nɛɛ́lɛ̀, 10*2)
6	loḍò/looro/lèèjò, (3PL)	100	20*5, < Ewe, ('guinea fowl')
		1000	kòtòkó, kpoŋ

i. *Eastern Grusi (Table 0.111)

Table 0.112: Northern Grusi numerals (*)

1	du/lu, (téngí)	7	pè, (4+3, 5+2)
2	le/lə̀/(ɲìí)	8	nānā (4 redupl.), (lyɛlɛ, bàndá)
3	tò/twà/cɔ́ɔ̀	9	nɔ̀gʊ, nìbu, (10-X)
4	na/nīān/nàas	10	fúgɔ́, (fo)
5	nu	20	10*2, (sāpōā, 10+10, swéní)
6	dʊ̀, (5+pi)	100	bi, (z̆m)
		1000	mʊ̀rʊ̀

ii. *Northern Grusi (Table 0.112)

Table 0.113: Western Grusi numerals (*)

1	kpáŋ/kpee, bala, do/deo/dííŋ/digi	7	lʊp,pɛ́ɛ́/piɛ , 5+2
2	lɛ/nɛ/lìɛ	8	córí/kyórí, 5+3, (pɔɔ)
3	toro	9	nɛ́mɛ́/nìbí, 10-1, 5+4
4	naa/naasi/naare	10	fi
5	nue/nwɔ́/nɔ̀ŋ	20	mɛ́rɛ́, mʊgɔ́ (< Mande?), (máágí, toko, ma-cu?)
6	lʊ̀rʊ̀/*lug/dʊ̀, 5+1, (go)	100	kɔ̀wá/kɔ̀ɔ́, zɔ́lɔ́, lafa
		1000	gboŋ/bʊ́í

iii. *Western Grusi (Table 0.113)   The most probable *Proto-Grusi reconstructions based on the roots attested in at least two Grusi branches are summarized in the table below (Table 0.114):

Table 0.114: Proto-Grusi numeral system (*)

1	do/du/lu, de/re	7	pɛ/lʊ-pɛ/lʊ-bɛ, 5+2
2	lɛ/le/ne/ɲi	8	4 redupl.
3	toro/toso/tɔ	9	10-1, nibi/nibu (ni-bi/bu?)
4	naare/naasi/na	10	fu/fi
5	nu/nʊ	20	10*2?
6	dʊ/lo-ɖo/lo-ro, 5+1	100	20*5? bi? kɔwa/kɔɔ?
		1000	kpoŋ/gboŋ

0.8.2.2.4 Kirma-Tyurama

Table 0.115: Kirma-Tyurama numerals

1	déiŋ/dẽẽná	7	5+2
2	hã́ĩ/hãl	8	5+3
3	síɛi/siɛl	9	5+4, 10-1
4	na(a)	10	nṹs̀ɔ̀/cĩ́ŋcíelùo
5	dɨ	20	kómòrré/ɡuɾ̃
6	5+1	100	ɡundi, 20*5
		1000	200*5, 800+200

0.8.3 Kulango

Table 0.116: Kulango numeral system

1	ta(a) < *ta̰à̰	7	5+2
2	bila(< Mande), nyʊ̀ʊ̀	8	5+3
3	sããbe (< Mande)	9	5+4
4	na	10	nuunu (< *5redupl.), *ji/yi
5	tɔ	20	yipì-/dʒipi-
6	5+1	100	kɛmè (< Mande)
		1000	wulo (< Mande)

The source form of the term for 'one' with a nasalized vowel is reconstructed on the basis of the evidence presented by Stefan **Elders2007**. As we have seen, the Gur term for 'five' is reconstructed as *nu* on the basis of the evidence provided by the groups discussed above. It should be noted that this form goes back to the lexical root meaning 'hand' (Kulango *nu-gò*). The term for 'ten' in Kulango is a reduplicated *nu*, whereas a different root is attested for 'five'. It is also noteworthy that the terms for 'two', 'three', 'hundred' and 'thousand' are borrowed from Mande.

0.8.4 Lobi-Dyan

According to Anthony Naden's classification (**Naden1989**), these languages belong to different groups of the Gur languages, so their evidence will be presented separately.

"More recent classifications (Labouret and Manessy) regarded Lobi (Lobiri) and Ja̰a̰ne as closely related" (**MieheTham2007**) (Table 0.117).

Table 0.117: Lobi-Dyan numerals

	Lobi	Dyan	*Lobi-Dyan
1	bìɛ̀l, *do	bɛ̃g/ɓɛ̰̀(ŋ)kù/bɪɛle, *dṵ̀	bɪɛ̀l, *dò
2	nyɔ̀/nɔ̀	nyɔ̰̀	nyɔ̀(n)
3	tʰĕr	tʰɛ̰̀s(i)	tʰɛ̰̀s(i)/tʰĕr
4	nắ	nàà̰	nắ
5	mɔ̀ì/*mà	dìèmà, *mɔ̀lɔ̀	mɔ̀ì/*mà/*mɔ̀lɔ̀, dìèmà,
6	5+1	5+1	5+1
7	5+2	5+2	5+2
8	5+3	5+3	5+3
9	10-1	10-1	10-1
10	nyɔ̀ɔ́r	ni-kpo	ni-kpo, nyɔ̀ɔ́r
20	kpèle	ceeru	kpèle, ceeru
100	tàmâ	tàmúgú	tàmâ
1000	gbɔ̀lanɪ	100*10	gbɔ̀lanɪ, 100*10

0.8.5 Senufo

Table 0.118: Senufo numerals

1	nɔ̀n-, ni-ŋgbe/nuŋgba, nìkì̀/ningin	7	5+2, 6+1
2	sin/soin/sun/syen	8	5+3, 6+2
3	tã̀ã̃/taàr	9	5+4, 10-1, 6+3
4	tésyàr/sīcēr ̄ɛ/tityere	10	kɛ
5	bwa/bwɔ, guru/kuru (<'fist'), guno, (nɔ)	20	gbèɲ/ɠɓēy, fulo, toko/togo, nafa, isolated forms
6	kwaɲ̀/kwāy, gbaara, gɔlɔŋ , 5+1, (nõli)	100	20*5, lafa (< Kwa)
		1000	200*5, (gben-, bɔlɔ, pwoo, sakere)

Many of the forms are quoted in brackets, i.e. they are isolated forms attested within the Senufo group comprising about fifteen idioms. As in a number of other Gur branches, the last syllable/segment of a numerical term often represents a coordinating noun class suffix. Below is an excerpt from the table showing the inflection of numerals by class in Tenyer (Syer variety), as published by Klaudia Dombrowsky-Hahn in (Miehe; Reineke; **Winkelmann2007f**:420) (Table 0.119):

Table 0.119: Tenyer numerals (a fragment)

Class SG	u	li	ke	te dim.
'one'	nun	nuni	nuŋ	nunge
Class PL	pi	ki	yi	te dim.
'two'	syob ~ syou	syã	syii	syimbi
'three'	trab	tar	tar	tarbi
'four'	tikyireb	tihyɛr	tihyɛr	tihyɛrbi

This presentation illustrates how problematic defining the numerical roots can be.

0.8.6 Teen

Table 0.120: Teen numerals

1	tani	7	5+2
2	nyor	8	5+3
3	sanr	9	10-1
4	nan	10	pɔrwɔ
5	tɔ	20	toko
6	5+1	100	20*5
		1000	danyɛ

0.8.7 Tiefo

Table 0.121: Tiefo numerals

1	dɛ̰̀	7	5+2
2	jɔ̃	8	5+3
3	sɛ̰́	9	5+4
4	ʔuʔɔ̰́/ŋɔɔ	10	támú, kɛ̃
5	kɛ̰̀	20	kpã
6	5+1	100	20*5
		1000	waga (< Mande)

0.8.8 Tusia

Table 0.122: Tusia numerals

1	nɔ́nkì, *nɔ̃́ŋ	7	5+2
2	nínɔ́, *nĩ́ŋ	8	5+3
3	tɔ̃́nɔ́	9	5+4
4	ńyɑ́h/jɑ̃́	10	gbãm/*gbɔ̃/bwɔ̀
5	k(w)lɔ́	20	túkúrí, *tiki
6	5+1	100	20*5, kwɛ̌
		1000	< píy 'goat', nɑ̃́ˤ'cow'

0.8.9 Viemo

Table 0.123: Viemo numerals

1	dũde, *dun-	7	5+2?
2	niinĩ	8	4*2, 5+3
3	sãsĩ	9	10-1
4	jumĩ	10	kwɔmũ
5	kuɛge, *kɔ̠	20	fɛrɛyɔ
6	5+1	100	tãmõ
		1000	vie-?

0.8.10 Wara-Natioro

It should be noted that the most important evidence pertaining to this group is relatively recent. In his publication of the comparative lexical list Tasséré Sawadogo noted that Faniagara is radically different from both Wara and Natioro (**Sawadogo2002**). Its similarity index with the Natioro and Wara dialects is 12 and 30 percent respectively (the SIL list? idem., p. 15). Thus he had every reason to postulate the existence of an isolated language (Palɛn) in the Wara-Natioro group.

Since the data collected by Tasséré Sawadogo is absent from the major databases that are now incorporated into the RefLex database by Guillaume Segerer, it

seems reasonable to present it below for each Wara-Natioro-Paleni idiom in order to suggest the reconstruction of numerical terms within each of the three sub-groups and within the group as a whole (Table 0.124):

Table 0.124: Wara-Natioro-Paleni numerals

		'1'	'2'	'3'	'4'	'5'
Natioro	Dinaoro	ká:bà	ɲíndí	táe	ŋnáe	sùsú
Natioro	Timba	ká:bà	ɲíndí	tá	nã́	sùsú
Natioro	Kawara	kābà	ɲìdí	tá	ná	sùsú
*Natioro		ká:bà (ka-ba?)[11]	ɲíndí	tá(é)	ná (é)	sùsú
Wara?	Sourani	pɔ́	b�̌	tã́	nàsá	sùsú
Wara	Negeni	kàpó	bɔ̌	tí:	nã́:sű	sùsú
Wara	Niansogoni	pɵ́:wò	bɔ̌	tí:	ná:só	sùsú
*Wara		pɔ́	bɔ̌, *nĩ̄ntó	tã́(i)	naaso	sùsú,
Palɛn	Faniagara	káfā	bá	tã́:ré	ná:ré	sùsú
*Palɛn	Faniagara	ká-fā	bá, *nínté	tã́:ré	ná:ré	sùsú, *si/sɔ
*Wara-Natioro-Paleni		**ba/fa, pɔ**	**nínté, bɔ̌**	**ta(r)i**	**na(r)i**	**sùsú, sV**
		'6'	'7'	'8'	'9'	'10'
Natioro	Dinaoro	ŋzàbɔ́	té:ndé	nã́ŋgànã́ŋgánì	kâwó	pwɔ̀:
Natioro	Timba	ŋ̀zà:bɔ́	dé:ndí	náŋgánáŋgánì	kāwɔ̀mű	pwɔ́:
Natioro	Kawara	nsàbɔ́	tèndí	nàŋgānàŋgádí	kàwűmò	pɔ́
*Natioro		nsàbɔ́ (sa-1?)	téndí	4+4	kawo	p(w)ɔ́
Wara?	Sourani	sùrpɔ́	sūrùdó	sĩ̀ntá	sĩ̀n:á	kã̀n:sú
Wara	Negeni	sírípò	sĩ́nĩ̄ntó	sĩ̄ntí	sīn:á:sű	kã̀:sá
Wara	Niansogoni	sírìpò	sùrùntó	sī:ntí:	sín:ã́:sű	kã̀:sá
*Wara		si-1	si-2	si-3	si-4	kã̀:sá
Palɛn	Faniagara	sĩ́nífà	sĩ́nínté	sɔ̄tá:ré	sɔn:á:ré	fɔ́
*Palɛn	Faniagara	si-1	si-2	sɔ̄-3	sɔ̄-4	fɔ́
*Wara-Natioro-Paleni		**5+1**	**5+2, téndí?**	**5+3, 4+4**	**5+4, kawo?**	**p(w)ɔ/fɔ, kã̀:sá?**

---

[11]Regarding the Natioro forms for 'one' André Prost remarks: '*puwolo* (après un substantif: *kaaba)*' (**Prost1968**). Thus, the opposition between the Wara and Natioro forms of 'one' re-

According to other sources, the forms *wɑ̃́/ nwõ, sɔ* are attested in Wara-Natioro for 'twenty'. The patterns '20*5' and '400*2+200' are attested for 'hundred' and 'thousand' respectively.

0.8.11 Proto-Gur

0.8.11.1 'One'

The main forms of 'one' reconstructable in sixteen branches of Gur are as follows (Table 0.125):

Table 0.125: Stems for '1' in Gur

A. Bariba				tiā
B. Central:	do			
1. Northern				
A. Bwamu				
B. Kurumfe	dom			
C. *Proto-Oti-Volta		den/ yen, de?		ni
Southern		le	kpò	
A. Dogoso-Khe				
C. Gan-Dogose		lèŋ	kpo/ po	
D. *Proto-Grusi	do/ du/ lu	de/ re		
E. Kirma-Tyurama		déiŋ/ dẽẽná		
C. Kulango				ta(a) < *ta̰à̰
D. Lobi-Dyan	*dò			
E. Senufo			ni- ŋgbe/ nu- ŋgba	nìkì̀/ ningin
F. Teen				tani
G. Tiefo		dɛ̌		
H. Tusia				nɔ́nkì
I. Viemo	dũde, *dun-			
J. Wara-Natioro-Paleni		pɔ		

---

flected in the table may be purely functional (for Wara Prost quotes the *puwo* and *kapo* forms).

An attempt to reconstruct a Proto-Gur form is probably not reasonable at this point, since all the forms quoted above are important for comparative purposes.

0.8.11.2 'Two'

Table 0.126: Stems for '2' in Gur

	'2'	'2'	'2'	'2'	'2'
A. Bariba	ru				
B. Central:					
1. Northern					
A. Bwamu	ɲū				
B. Kurumfe				hĩĩ	
C. *Proto-Oti-Volta		li/yi			
Southern					
A. Dogoso-Khe	jɔ(n)				
C. Gan-Dogose	yɔ̰́/ ɲɔ̰/ dʒɔ̰̀ŋ				
D. *Proto-Grusi		lɛ/ le	ne/ ɲi		
E. Kirma-Tyurama				hã́ĩ/ hãl	
C. Kulango	nyʊ̀ʊ̀				bila (< Mande)
D. Lobi-Dyan	nyɔ̀(n)				
E. Senufo					sin/ soin/ sun/ syen
F. Teen	nyor				
G. Tiefo	jɔ̃				
H. Tusia			nínɔ́, *nĩ̃ŋ		
I. Viemo			niinĩ		
J. Wara-Natioro-Paleni			nĩ́nté		bǒ

Apparent isolates and obvious borrowings are presented in the rightmost column.

0.8.11.3 'Three' and 'Four'

Table 0.127: Stems for '3' and '4' in Gur

	3	3	4	4
A. Bariba	i-ta		ǹ-nɛ	
B. Central:				
1. Northern				
A. Bwamu	tĩ		náa	
B. Kurumfe	tãã		nãã	
C. *Proto-Oti-Volta	ta(t)		naa(si)	
Southern				
A. Dogoso-Khe	thɔ		dáa	
C. Gan-Dogose	sá̰a̰/ tʰɔ̰ʔ		ɲee/ ì-yi̤i̤, (á-dàa)	
D. *Proto-Grusi	toro/ toso/ tɔ		naare/ naasi/ na	
E. Kirma-Tyurama	síɛi/ siɛl		na(a)	
C. Kulango		sããbe (< Mande)	na	
D. Lobi-Dyan	thɛ̰̀s(i)/ tʰɛ̆r		nɑ̰́	
E. Senufo	tã̰ã̰/ taàr			tésyàr/ sīcɛ̄rɛ̰́/ tityere
F. Teen	sanr		nan	
G. Tiefo	sɑ̰́			ʔuʔɔ̰́/ ŋɔɔ
H. Tusia	tɔ̰́nɔ́		ńyɑ̰́h/ jɑ̃́	
I. Viemo	sãsĩ			jumĩ
J. Wara-Natioro-Paleni	ta(r)i		na(r)i	

The reflexes of the most persistent NC roots are observable in the majority of the branches.

0.8.11.4 'Five'

Table 0.128: Stems for '5' in Gur

	'5'	'5'	'5'	'5'	'5'
A. Bariba	nɔɔbù				
B. Central:					
1. Northern					
A. Bwamu	hò-nú				
B. Kurumfe	nɔm				
C. *Proto-Oti-Volta	nu				
Southern					
A. Dogoso-Khe	nɔ(n)				
C. Gan-Dogose	nɛ̀n	mwã/ wɛ̀a			
D. *Proto-Grusi	nu/ nʊ				
E. Kirma-Tyurama				di	
C. Kulango			tɔ		
D. Lobi-Dyan		mɔ̀ì/ *mà/ *mɔ̀lɔ̀		dìèmà	
E. Senufo	guno, (nɔ)	bwa/ bwɔ			
F. Teen			tɔ		
G. Tiefo					kɛ̀
H. Tusia					k(w)lɔ́
I. Viemo					kuɛge, *kɔ̱
J. Wara-Natioro-Paleni			sùsú, sV		

The etymological relationship of *nu '5' and 'hand', is attested in Central Gur and possibly in Bariba and Senufo. Isolated bases may go back to this meaning as well. At the same time, the base preserved in Kulango, Teen and possibly Wara-Natioro-Paleni is comparable to *tan found in BC and some other families.

Table 0.129: Stems and patterns for '6' and '7' in Gur

	'6'	'6'	'7'	'7'	'7'
A. Bariba	5+1		5+2		
B. Central:					
1. Northern					
A. Bwamu	5+1		5+2		
B. Kurumfe		hʊrʊ		pɛ̃ɛ̃	
C. *Proto-Oti-Volta		lob/ yob		poi(n)?	*lob-le (6+1)?
Southern					
A. Dogoso-Khe	5+1		5+2		
C. Gan-Dogose	5+1		5+2		
D. *Proto-Grusi	5+1	dʊ/	5+2	pɛ/	
		lo-ɖo/		lʊ-pɛ/	
		lo-ro		lʊ-bɛ	
E. Kirma-Tyurama	5+1		5+2		
C. Kulango	5+1		5+2		
D. Lobi-Dyan	5+1		5+2		
E. Senufo	5+1,	kwaɲ̀/	5+2		6+1
		kwāy,			
		gbaara,			
		nõli			
F. Teen	5+1		5+2		
G. Tiefo	5+1		5+2		
H. Tusia	5+1		5+2		
I. Viemo	5+1		5+2?		
J. Wara-Natioro-Paleni	5+1		5+2		téndí?

0.8.11.5 'Six' and 'Seven'

The patterns *'6=5+1' and *'7=5+2' can be safely reconstructed at the Proto-Gur level. The exeptionally wide range of forms for 'six' attested in Senufo is noteworthy.

0.8.11.6 'Eight' and 'Nine'

Table 0.130: Stems and patterns for '8' and '9' in Gur

	'8'	'8'	'8'	'9'	'9'	'9'
A. Bariba	5+3			5+4		
B. Central:						
1. Northern						
A. Bwamu	5+3					dìiní/ dènú
B. Kurumfe			cɔɔ			fa
C. *Proto-Oti-Volta			ni			wey/weʔ
Southern						
A. Dogoso-Khe	5+3			5+4		
C. Gan-Dogose	5+3			5+4	10-1	
D. *Proto-Grusi		4 redupl.			10-1	nibi/nibu (ni-bi/bu?)
E. Kirma-Tyurama	5+3			5+4	10-1	
C. Kulango	5+3			5+4		
D. Lobi-Dyan	5+3				10-1	
E. Senufo	5+3		6+2	5+4	10-1	6+3
F. Teen	5+3				10-1	
G. Tiefo	5+3			5+4		
H. Tusia	5+3			5+4		
I. Viemo	5+3	4*2			10-1	
J. Wara-Natioro-Paleni	5+3	4+4		5+4		kawo?

In addition to the common patterns '8=5+3' and '9=5+4', alternative ones are attested for 'eight' and 'nine' ('8=4 redupl.' and '9=10-1' respectively).

0.8.11.7 'Ten'

Table 0.131: Stems for '10' in Gur

A. Bariba		wɔ-kuru			
B. Central:					
1. Northern					
A. Bwamu	pílú/ píru/ ˀɓúrúù				
B. Kurumfe	fɪ				
C. *Proto-Oti-Volta	pi(k)				
Southern					
A. Dogoso-Khe	kpélé				
C. Gan-Dogose		kpoogo	nõy - 5PL		gbùnè, kpélé, sí-
D. *Proto-Grusi	fu/ fi				
E. Kirma-Tyurama			nűɔ́sɔ̀		cíŋcíelùó
C. Kulango					nuunu (< *5 redupl.), *ji/ yi
D. Lobi-Dyan		ni-kpo	nyɔ̀ɔ́r		
E. Senufo				kɛ	
F. Teen	pɔrwɔ				
G. Tiefo				kɛ̃	támú
H. Tusia					gbãm/ *gbɔ̃/ bwɔ̀
I. Viemo		kwɔmũ			
J. Wara-Natioro-Paleni	p(w)ɔ/ fɔ				kằːsá?

This term exhibits a variety of isolated (and possibly non-primary) forms. The main form has a voiceless labial as its initial consonant.

0.8.11.8 'Twenty'

Table 0.132: Stems and patterns for '20' in Gur

	'20'	'20'	'20'	'20'	'20'
A. Bariba					yɛndu
B. Central:					
1. Northern					
A. Bwamu		ɓóní/ ɓénle/ kēwēníì			
B. Kurumfe	sofe (<10?)				
C. *Proto-Oti-Volta	10*2				
Southern					
A. Dogoso-Khe		gʊ̀ʊsì	cúkúrì		
C. Gan-Dogose		gbeere	tʃúkúrì		
D. *Proto-Grusi	10*2?				
E. Kirma-Tyurama		guɾ̃			kómòrré
C. Kulango					yipì-/ dʒipi-
D. Lobi-Dyan		kpèle	ceeru		
E. Senufo		gbèɲ/ gbēy,		toko/ togo toko	fulo, nafa
F. Teen				toko	
G. Tiefo					kpã
H. Tusia			túkúrí		*tiki
I. Viemo					fɛrɛyɔ
J. Wara-Natioro-Paleni					wá́/ nwõ, sɔ

In view of the great variety of forms and patterns attested for this term, the existence of the term for 'twenty' in Proto-Gur is uncertain.

0.8.11.9 'Hundred'

Table 0.133: Stems and patterns for '100' in Gur

A. Bariba	20*5			
B. Central:				
1. Northern				
A. Bwamu				kʰĭminù (< Mande keme)
B. Kurumfe			bɛrʊ	
C. *Proto-Oti-Volta		kob, kook		
Southern				
A. Dogoso-Khe	20*5			
C. Gan-Dogose	20*5			
D. *Proto-Grusi	20*5?	kɔwa/ kɔɔ?	bi?	
E. Kirma-Tyurama	20*5		gundi	
C. Kulango				kɛmɛ̀ (< Mande)
D. Lobi-Dyan		tàmâ		
E. Senufo	20*5			lafa (< Kwa)
F. Teen	20*5			
G. Tiefo	20*5			
H. Tusia	20*5	kwɛ̆		
I. Viemo		tãmõ		
J. Wara-Natioro-Paleni	20*5			

0.8.11.10 'Thousand'

Table 0.134: Stems and patterns for '1000' in Gur

A. Bariba			fɔ̀rɔ̀tɔ?
B. Central:			
1. Northern			
A. Bwamu		100*10	muaseé
B. Kurumfe			tʊsrɪ (< Moore)
C. *Proto-Oti-Volta			
Southern			
A. Dogoso-Khe	kpɛ́		
C. Gan-Dogose	kpíɛ 'a goat'		
D. *Proto-Grusi			kpoŋ/ɡboŋ
E. Kirma-Tyurama		200*5, 800+200	
C. Kulango			wulo (< Mande)
D. Lobi-Dyan		100*10	ɡbʊ̀lanɪ
E. Senufo		200*5	gben-, bɔlɔ, pwoo, sakere
F. Teen			danyɛ
G. Tiefo			waga (< Mande)
H. Tusia	< píy 'goat', ná́ˤ 'cow'		
I. Viemo	vie-?		
J. Wara-Natioro-Paleni		400*2+20	

No evidence supports the reconstruction of the term for 'thousand' in this family.

0.9 Mande

The intermediate step-by-step reconstructions available for the Mande languages in Vydrin's Mande Etymological Dictionary (ms) and in **Vydrin2007**[12] has made treatment of the data easier.

The genetic classification of Mande, outlined in the latter work, will serve as the basis for our analysis. This classification differs from the one suggested by R.Kastenholz and is accessible via *Ethnolog*. According to V.Vydrin, 'Its major innovations, in comparison with that of Kastenholz, are the following:

– the Susu–Jalonke group is put together with the Southwestern group, rather than with Kastenholz's "Central Mande" (in fact, it is a return to the proposal of André **Prost1958**);

– Soninke–Bozo, Samogho and Bobo are no longer considered as branches of the same genetic unit (Kastenholz's "Northwestern Mande"), but rather as independent groups inside Western Mande;

– the Mokole group is put together with Vai–Kono, rather than with Manding;

– in the Southern Mande group, Mwan is separated from Wan and put together with the Guro–Yaure subgroup;

– San (Samo) is put together with Bisa, rather than with Busa-Boko.' (**Vydrin2016**: 110).

Let us note an important fact: the numeral system of Jowulu differs considerably in certain points both from other Samogho languages and from Mande languages in general. It is interesting to outline that in R. Kastenholz's classification (based on the method of shared innovations, rather than on lexicostatistics) Jowulu is given a special status, more precisely, the first split in his Northwestern Mande branch (Bozo-Soninke + Bobo + Samogo + Jowulu).

Our further analysis will be based on the evidence from twelve branches of Mande represented in the diagram below.

0.9.1 'One'

Vydrin's preliminary reconstructions, as well as isolated forms resulting from the analysis of the numerical terms, are marked with an asterisk [*].

The isoglosses for 'one' suggest the existence of two alternative roots (**do* and **kelen*) attested in both major Mande groups. The latter root is distinguishable under the assumption that the forms with a voiced velar attested in the Eastern

---

[12]I would like to thank V. Vydrin for his suggestions and comments on the preliminary draft of this chapter.

Table 0.135: Scheme 3.1. Mande languages

1. Manding		7. Bozo-Soninke		
2. Jogo-Jeri		8. Bobo		
3. Mokole	5. Susu	9. Samogo		11. Eastern
4. Vai-Kono	6. SWM	10. Jowulu		12. Southern

Table 0.136: Mande stems for '1'

Manding	*dɔ́	*kélen			
Jogo-Jeri	*do	*kɛlɛ (?)			díé(n)/ dúlì
Mokole	*dɔ́ndɔ̀	*kéle̱			
Vai-Kono	*dɔ́ndɔ	*N-kélen			
Susu		*kédén	nde/ ǹdá		
SWM		*gìláaŋ	*tà		
Bozo-Soninke		kuɔn/ kɛnɛ/ ke̱/ ko̱		sa̱na̱	bane, fie
Bobo			tàlá/ tèlé		
Dzuun (Samogo)		*ké		*so/ sɔʔi/ swɛ̃̄	
Jowulu			tẽẽna/ tenŋ		
SE-Eastern	*do	gɔ̀rɔ́/ gôon?			
SE-Southern	*dʋ̄				

108

branch of the South-Eastern group (Matya Samo *gɔ̀rɔ́*, Southern Samo (Maka) *gôon*) are related to the **k**-forms found in Western Mande.

The next two roots, if related, may be suggestive with regard to the classification of Western Mande (otherwise, they probably represent similar unrelated forms). It should be noted that the root *ǹdá* (Susu *nde* 'one, certain', *ndende* 'anybody, whoever; nobody', Jalonke *ǹdá* 'certain') attested, according to Vydrin, in Susu-Jalonke may be related to **do*. The determiner **dó*, which can be reconstructed at the Proto-Mande level, goes back to the root **do*.

The rightmost column of the table embraces the isolated forms.

0.9.2 'Two'

Table 0.137: Mande stems for '2'

Manding	*fìlá
Jogo-Jeri	*fàlá
Mokole	*fìla
Vai-Kono	*fèLá
Susu	*fìdíń
SWM	*fèelé
Bozo-Soninke	pɛ̀:ndé, fíllò
Bobo	pálà
Dzuun (Samogo)	fǐ:(kí)
Jowulu	fúúli
SE-Eastern	*pela
SE-Southern	*pìì-lāŋ

A common root for 'two' that may be tentatively recorded as *pila / fila* is attested in all Mande branches. Its precise phonetic reconstruction is beyond the scope of our investigation. The reader can refer to the works of specialists in the historical phonetics of Mande. A reference designation that will enable us to compare this root to the evidence of the other NC families is sufficient for our reconstruction purposes.

0.9.3 'Three'

Table 0.138: Mande stems for '3'

Manding	sàbá	
Jogo-Jeri	sègbá/sigbù	
Mokole	sàwa/saba	
Vai-Kono	sàkpá/sagba/sáwa	
Susu	sàxán/sàqáŋ/sawa	
SWM	sàwá/sāaɓā	
Bozo-Soninke	síkkò, sike	
Bobo	sàà (?)	
Dzuun (Samogo)	ʒiʔi/ʒìːgī ´/ʃwɛ̀/ɣei	
Jowulu	bʒei < *jɔnŋ/i?	
SE-Eastern	sɔɔ/cɔ́w?	ʔààkɔ̃
SE-Southern		*γààká

The common root *sakpa/ sagba/ sawa* is represented in all Western branches. The relationship between some of the forms attested in the Eastern group (Southern Samo (Maka) *sɔ̄ɔ̄*, Matya Samo *tjɔwɔ*) remains uncertain. The Jowulu form is especially peculiar. It should be noted that the forms of some numerical terms differ significantly depending on the source. Our study is based on four Jowulu sources that provide the following evidence[13] (Table 0.139):

The terms for 'seven', 'eight' and 'nine' follow the pattern '3,2,1+'to lose'' respectively (cf. their inaccurate interpretation in Hochstetler, see §0.9.9), hence the reconstruction of the term for 'three' with the initial palatal (*jɔ̀n*). The forms quoted in Jowulu for 'three', 'four', and 'ten' are uncommon. If we were dealing with a language with a noun class system, we would have to conclude that a noun class marker (cl19?) with two allomorphs (**p**- and **b**- before voiced and voiceless respectively) is traceable in the pertinent forms. However, we are dealing with a language that undoubtedly belongs to Mande, so no class-related morphemes can be involved. This leaves the presence of the initial labial in the term for 'three' unexplained. A borrowing from Gur or Kru cannot be assumed since these languages lack the comparable forms. The only plausible solution is the alignment of 'three' and 'four' by analogy with 'ten' where it must have been originally

---

[13]Hochstetler   https://mpi-lingweb.shh.mpg.de/numeral/Jowulu.htm,   **DjillaEtAl2004**; **Carlson1993**; **Prost1958**.

Table 0.139: Jowulu numerals

Source	'1'	'2'	'3'	'4'	'5'
Hochstetler1996	tēēna	fuuli	**bʒ**ei, *dʒɔ̃	**pʃ**ɪrɛˈ	tãã
DjillaEtAl2004	tenŋ	fúúli	byàŋ, *jɔ̀n	pyiiraŋ	táánŋ
Carlson1993	tɛ̀ɛ̀nì	fu'u'lī	byāī *jɔ̱̄ɔ̱̄	pi'i'rēī	ta̱ˈa̱ˈ
Prost1958	têna	fole	dyue, *dyô	piœe	tâ

Source	'6'	'7'	'8'	'9'	'10'
Hochstetler1996	tãmănɪ	dʒɔ̃m-pʊn	ful-pʊn	tẽm-pʊn	**bʒ**ĩĩ
DjillaEtAl2004	táán-mání	jɔ̀n-pɔnni	fuuli-pɔnni	ten-pɔnni	byìnŋ
Carlson1993	ta̱ˈa̱ˈ-mānī	jɔ̱̄ɔ̱̄-po'nì	fu'l-po'nì	tɛ̱̀ɛ̱̀-po'nì	byì̱
Prost1958	ton-te	dyômpônô	filepônô	têpônô	bî

present.

A special term for 'three' appears in South-Eastern. In Eastern it can be reconstructed as *ʔààkɔ̃ or possibly **ʔàà-(kɔ̃), cf. Bisa kakʊ́, Boko ʔààɔ̃ (in **Koelle1963** ááɣo̱), Bokobaru (Zogbẽ) ʔààgɔ̃, Busa ʔààkɔ̃, Maya Samo kàakú, Kyanga ˀāà:, and Shanga ʔà. The latter reconstruction is supported by the fact that the terms for 'three' and 'four' share the ultima, cf. the data are presented in the following table (Table 0.140):

Table 0.140: Final morphemes in the Boko-Busa numerals

	Boko	Boko (**Koelle1963**)	Bokobaru	Busa
'3'	ʔàà-ɔ̃	áà-ɣo̱	ʔàà-gɔ̃	ʔàà-kɔ̃
'4'	síí-ɔ̃	síí-ɣo̱	síí-gɔ̃	ʃíí-kɔ̃

It should be noted that in these languages, the syllable in question is also present in the terms for 'eight' that are built according to the pattern '5+3' (cf. e.g. Bobo Karu sɔ́r-ààgɔ̃). Here we may be dealing with alignment by analogy, possibly with an additional final morpheme of uncertain meaning. It should be stressed that the ultima in 'three' and 'four' is never the same in the Eastern subgroup of the South-Eastern languages, whereas the medial velar is only attested in 'three' but not in 'four'. Assuming that the forms of the two Eastern branches

are related, the term for 'three' can be reconstructed as *ʔàːkɔ̃/yàːká*, whereas the term for 'four' may be interpreted as resulting from the alignment by analogy with the forms of 'three' attested in the Eastern branch of South-Eastern Mande. The evidence in favor of its etymological connection with *sakpa* is inconclusive.

0.9.4 'Four'

Table 0.141: Mande stems for '4'

Manding	*náani	
Jogo-Jeri	náani	
Mokole	náani	
Vai-Kono	náánì	
Susu	náání	
SWM	*náánì	
Bozo-Soninke	na:na/nàtã́/nà:rá/naxat-	
Bobo	náà/nìã̀	
Dzuun (Samogo)	nã̀ãi/naai/nà:lɛ́	
Jowulu		pʃɪrɛˈ <ʃɪrɛˈ?
SE-Eastern		sì/sííkɔ̃
SE-Southern		*yìì-sḭ̀ḭ̀yá̰: zɪ̀ɛ́/yîî-sīɛ̃

An easily recognizable NC form (*náání/ nã̀ãi*) can be reconstructed in Western Mande, whereas in South-Eastern Mande it is replaced with an innovation (*sḭ̀ḭ̀yá̰*). This innovation may also be attested in Jowulu.

0.9.5 'Five'

Table 0.142: Mande stems for '5'

Manding	dúuru/loolu	*wo (cf. '7')		
Jogo-Jeri	sóólò/sóolo			
Mokole	lɔ́ɔlu	*wo (cf. '7')		
Vai-Kono	dúʔu/sóó(ʔ)ú			
Susu	suuli/sùlù	*fò (cf. '7')		
SWM	dɔ́ɔlú/lɔ́ɔlu	*wɔ/ngɔ̀		
Bozo-Soninke		kɔ́lɔ́hɔ̀/kárágò		
Bobo		kō/kóò		
Dzuun (Samogo)				nǜ
Jowulu			tãã	
SE-Eastern	*sodu: sɔ́ɔro/sɔ́ɔ̀			
SE-Southern	sɔ́ɔɗú/sólú			

There is a correspondence between **d-/ l-/ s-** within Western Mande, hence the Eastern forms with the initial **s-** should not necessarily be treated separately. A discussion of the exact phonetic reconstruction is better left to specialists in the field. For our purposes, it is sufficient to record that the Proto-Mande root for 'five' is reconstructed as *dúuru/ sɔ́ɔru.*

At the same time, the root(s) *wo, *ko* are traceable in the compound numerical terms attested in Western Mande. They may be etymologically related to the lexical root meaning 'hand' (Vydrin, p.c.; cf. Proto-South-Mande *kɔ̀* 'hand'). The latter may be a NC root, cf. e.g. the term for 'hand' in Proto-Gbaya (*kɔ́*), Dida (Kru) (*kō*) and in other languages.

The Jowulu and Samogo forms are peculiar. As we hope to demonstrate in the next chapter, two alternative roots for 'five' can be reconstructed for NC, namely *tan/ ton* and *nu(n).* Both roots are directly attested in these marginal groups. Is this enough to reconstruct the terms for 'five' traceable in NC for the Mande languages? We will return to this question in the last chapter of the book.

0.9.6 'Six'

Table 0.143: Mande stems and patterns for '6'

Manding	wɔ́rɔ (5+1)	
Jogo-Jeri	mɔ̀ɔ̀dó (5+1?)/mìːlù	
Mokole	wɔ́ɔrɛ/wɔyɔ (5+1)	
Vai-Kono	wɔ́ɔlɔ/wɔɔrɔ (5+1)	
Susu	sénní (5+1?)	
SWM	*5+1	
Bozo-Soninke	goro? (5+1?)	tűmù/tũmi
Bobo	5+1	
Dzuun (Samogo)		t(s)ũ̀mɛ̃́/tsìì
Jowulu	5+1	
SE-Eastern	5+1	
SE-Southern	5+1, wáŋ́?	

The reconstruction of the Mande term for 'six' is problematic. The root *t(s)um* is worth considering, since it is attested in both Bozo-Soninke and Samogo (the root found in Susu is probably isolated). Its reconstruction at the Proto-Mande level is, however, unlikely. The common pattern '6=5+1' is attested in both major branches. The root *wɔrɔ* is non-primary and eventually goes back to the aforementioned pattern (or to the pattern '6'='hand'+1' to be precise). This hypothesis is supported by the forms of 'seven' as well.

0.9.7 'Seven'

Table 0.144: Mande stems and patterns for '7'

Manding	x+2	
Jogo-Jeri	ma+2	
Mokole	x+2	
Vai-Kono	5+2	
Susu	5+2	
SWM	5+2	
Bozo-Soninke	ɲérù/jeeni	
Bobo	5+2	
Dzuun (Samogo)	ɲɛ̃̀:nɯ̃́ (<5?)/ɲɛ̀ɛ̀	
Jowulu		3+'to lose'
SE-Eastern	5+2	
SE-Southern	5+2	

A few remarks are in order before we turn to the discussion of the term for 'seven'. In the majority of the Mande branches, the term represents a compound. Its second element goes back to the term for 'two', cf. e.g. Jula *wólonfìlà* '7', *fìlà* '2'.

The relationship between the terms for 'six' and 'seven' is based on alignment by analogy. This bond sometimes results in unification of the terms, so that sources may explain 'seven' as '6+1' (despite the fact that 'two', not 'one', is manifestly present in 'seven'). This interpretation has become recurrent for the Mokole languages. According to Phillip Logan[14], the Kuranko evidence is as follows: *wɔrɔnfila* ('**6+1**') (?! –*K.P.*), *wɔrɔ* '6', *fila* '2', *kelen* '1'. The same idea is applied to Lele (cf. Marc Gebhard[15] : *wɔrɔŋ kela* (**'6+1'**)[16] , *wɔɔrɔ* '6', *fela* '2', *keleŋ* '1') and Kakabe (cf. Daria Mishchenko[17]: *wɔ́rɔwila* ('**6+1**'), *wɔ́ɔrɔ* '6', *fila* '2', *kélen* '1'). Other scholars are more reserved, stating that 'Kono has a decimal system with special construction for 7'[18]. It is, however, quite evident that the forms in

---

[14] https://mpi-lingweb.shh.mpg.de/numeral/Kuranko.htm

[15] https://mpi-lingweb.shh.mpg.de/numeral/Lele-Mande.htm

[16] According to (**Vydrine2009**), the Lele term for 'seven' is *wɔ́rɔncɛla* (or *wɔyɛnkela* in the Southern dialect).https://mpi-lingweb.shh.mpg.de/numeral/Jowulu.htmMende *núú ɠɓɔyɔ́ngo* '20' ('person finished'). https://mpi-lingweb.shh.mpg.de/numeral/Mende.htm

[17] https://mpi-lingweb.shh.mpg.de/numeral/kakabe.htm

[18] Raimund Kastenholz,https://mpi-lingweb.shh.mpg.de/numeral/kono.htm

question follow the pattern '5+2' (or at least 'X+2' with X being an unidentified component).

It is not a mere coincidence that the interpretation outlined above is recurrent in the Mokole languages, where the forms of 'six' and 'seven' have become partially unified. In a number of languages from other groups that have etymologically related terms for 'six' and 'seven', these terms differ in their second consonant, cf. Bamana (Manding): *wólonwula* '7', *wɔ́ɔrɔ* '6'.

In both groups of South-Eastern Mande the patterns '5+1' and '5+2' for 'six' and 'seven' respectively are still clearly recognizable (Table 0.145).

Table 0.145: Stems for '6' and '7' in South-Eastern Mande

	'5'	'1'	'6'	'2'	'7'
SE: Eastern: Busa	sóo	do	sóo-do	pia	soo-pia
SE: Southern: Beng	sɔ́-ŋ	do	sɔ́-do	pla-ŋ	sɔ́-pla

Taking all of this into consideration, the most likely evolution scenario for 'six' and 'seven' is as follows:

- At the most archaic Proto-Mande level the terms for 'six', 'seven' (and also 'eight' as we hope to demonstrate below) followed the pattern 'X+1,2,3' respectively. The X-element in this pattern possibly represented an archaic root with the meaning 'hand' (?) **ko*(**N-ko* > **go/wo*?).

- Proto-Mande developed the root **dúuru/ sɔ́ɔru* '5'.

- This new root served as the basis for the South-Eastern Mande terms for 'six', 'seven' and 'eight'.

- In Western Mande this process is only attested in single languages, e.g. in Vai (*sóóʔú* '5', *sɔ̀ŋ lɔ̀ndɔ́* '6' (*lɔ̀ndɔ́* '1'), *sɔ̀ŋ fɛ̀ʔá* '7' (*fɛ̀ʔá* '2')) and Looma (*dooluo* '5', *dɔzita* '6', *dɔfela* '7', *dɔ́sáwà* '8').

- The majority of the Western Mande languages retained the inherent forms for 'six' and 'seven', but their derivational motivation became unapparent (at least in the case of the first component, cf. Bandi *ndɔ̀ɔ́lú(ŋ)* '5', but *ngɔ̀hítáŋ* '6' (*hítàŋ* '1') and *ŋgɔ̀félàŋ* '7' (*feelé* '2') in contrast to Looma).

- This factor conditioned the partial unification of the terms for 'six' and 'seven' (by analogy) in some of the Western Mande languages (Mokole in particular).

0.9.8 'Eight'

Table 0.146: Mande stems and patterns for '8'

Manding	séegi/ séki/ séyi		
Jogo-Jeri		ma+3	
Mokole	sɛ́ɛn/ saɛn/ seyi		
Vai-Kono	séi/ séin	5+3	
Susu		5+3	
SWM		wá-yákpá/ wɔ-yaagba/ ngɔ̀sákbá(n) (5+3)	
Bozo-Soninke	segi-/ seegu		
Bobo	sɛ́kì/ tʃɛ̀kí		
Dzuun (Samogo)			kàà, 4pl
Jowulu			2+'to lose'
SE-Eastern		*5+3	síɲe, kíwísí (<4)
SE-Southern		sɑ̃̀ɑ̃-gā/ sáláàkā/ sɔ̀làá/ sé-yā̱ (5+3?)	

The pattern '8=4*2'/'4PL' commonly found in the majority of the families discussed above is barely attested in Mande. Meanwhile, the phonetic similarity between *naai* '4' ~ *ŋaai(n)* '8' (attested in the majority of the Samogo dialects) is hardly an accident.

The etymology of *kàà* (not found outside Seenku) is unknown.

The pattern '5+3' is inconclusive, because it often developss independently in various languages. The interpretation of the main Mande root (tentatively described as *seki/ segi*) is uncertain. On the one hand, its current forms suggest that this root can be reconstructed not only for Proto-Western Mande, but for Proto-Mande as well (cf. South-Eastern forms, in particular *sɑ̃̆ɑ̆gā* '8'). On the other hand, such reconstruction is hindered by at least two issues.

Firstly, the second velar in the South-Eastern Mande forms does not belong to the root. It is part of a reduced segment that goes back to the term for 'three' (cf. Tura *y̌ăká* '3'), whereas the first segment goes back to the term for 'five' (cf. Tura *sőlǔ, sőőlǔ, sǔlǔ̆*). The comparative analysis of the forms of 'eight' attested in

the South-Eastern Mande languages (not quoted here in detail) strongly suggests that the South-Eastern Mande pattern for 'eight' is '5+3'.

Secondly, this reconstruction is problematic from a typological point of view. As has been demonstrated above, our evidence prevents us from reconstructing primary roots for 'six' and 'seven'. In terms of typology, a primary root for 'eight' would look highly unusual in this context. Such a root could be expected in those few numeral systems where 'eight' is a basic numeral (just like 'twelve' is a basic numeral in some of the Benue-Congo numeral systems described above, hence '100=12*8+4'). However, 'eight' has never been a basic unit of counting in Mande systems. The existence of a primary term for 'forty' (assuming that 'forty' is '8*5') in some of the Mande languages could be interpreted as a hint at a special status of 'eight'. However, this is not supported by any real evidence.

This raises a question about the etymology of the Western Mande term for 'eight' (*seki/ segi*). Its resemblance to the term for 'three' (especially in Bozo and Soninke, cf. Jenaama Bozo *síkɛ̀ũ* '3' ~ *sèk:í* '8') may be suggestive here. Is there enough evidence to reject the hypothesis that 'eight' in the Proto-Western Mande was built according to the pattern '8=plus 3' (this would assume a counting reference to 'five')?

Despite the doubts expressed above, these forms are worth comparing to other forms of 'eight' attested in other NC families.

0.9.9 'Nine'

Table 0.147: Mande stems and patterns for '9'

Manding		kɔ̀nɔntɔ (10-1?)	
Jogo-Jeri	ma+4		
Mokole		kɔ̀nɔndɔn (10-1?)	
Vai-Kono	5+4	kɔ̀nɔ́ntɔn	
Susu	5+4		
SWM	5+4	10-1	
Bozo-Soninke			kàp:í/káfì/kabi
Bobo		kɔ̀rɔ̀nɔ̀ŋ	
Dzuun (Samogo)			kjè:rɔ̃́/kle:lo/kùòmɛ̀
Jowulu		1+'lose'	
SE-Eastern	5+4	10-1	
SE-Southern	5+4		

Two competitive patterns are distinguishable here ('9=5+4' and '9=10-1'). In some of the branches (e.g. SWM, Vai-Kono) they are attested side-by-side.

At the same time, these patterns cannot be postulated for some of the languages without additional support. The pattern '9=10-1' seems to be apparent in South-Eastern Mande and some of the SWM languages only, cf. Boko '9': *kɛ̀okwi* (lit: 'tear away 1 (from) 10'), *kwi* '10' ; in Busa '9': *kɛ́ndo/kíńdokwi* (lit: 'tear away 1 (from) 10'), *kwi* '10', *do* '1'; in Bandi (SWM) *taá-vu* '9', *ìtá(ŋ)* '1', *púu* '10'. According-ing to Robert Carlson (**Carlson1993**), the terms from 'seven' to 'nine' in Jowulu follow the pattern '1-3' + 'lose' (*fɔ́nì*), i.e. *jɔ̃ɔ̃-pɔ́nì* '7', *fúl-pɔ́nì* '8', and *tɛ̀ɛ̃̀-pɔ́nì* '9' (note that these terms are misinterpreted as 3+4, 2*4, 5+4[19] by Lee Hochstetler).

The root *kònonto/kɔ̀nɔndɔ(n)* attested in Manding and Mokole is unclear and deserves discussion by specialists. On the contrary, the forms interpreted as the combination of '5+4' in the table below seem to be quite transparent (Table **??**):

Table 0.148: '9 = 5+4' in Mande

Language	'9'	'5'	'4'
Kyanga	sòòʃí	sɔ́ɔ́rū	ʃíí
Tura	sɔ́ɨ̀sɛ̄	sólú	jɨ̀sɛ̄
Susu	sólómánáání	súlí	náání
Vai	sɔ̂ŋ náánì	sóó(ʔ)ú	náánì
Bobo Madare	kórónǰ	kóò	náà

This section, however, is not unproblematic. The Jogo-Jeri non-primary terms for '6-9' are formed by two components. The second (i.e. the terms for 'one', 'two', 'three' and 'four' respectively) is easily recognizable, whereas the etymology of the first (**ma-**) is unclear.

0.9.10 'Ten'

This term is especially interesting in light of the fact that the distribution of the isoglosses of 'ten' served as the basis for Maurice Delafosse's early classification of the Mande languages including the *Mande-tan* and *Mande-fu* groups. These two roots are indeed the main Mande roots with this meaning. However, their distribution does not correspond to the two major branches of Mande as they are distinguished today. The root **tan* is indeed found in all groups of the Western

---

[19] https://mpi-lingweb.shh.mpg.de/numeral/Jowulu.htm

Table 0.149: Mande stems for '10'

Manding	*tán	*bî	
Jogo-Jeri	táà(n), ta		
Mokole	tán	*bí	
Vai-Kono	tâŋ		
Susu	*tòngó	fùú	
SWM		*puu	
Bozo-Soninke	tan/téeŋ/cɛmi		
Bobo		fɔ̃̀	m̥ḿ
Dzuun (Samogo)	t(s)eũ/ceũ		
Jowulu			bʒĩĩ /byìnŋ
SE-Eastern		*fu/*vu (<* pu)	kwi/kuri, wókòì
SE-Southern		*bù	gɔ́ɔ̂(dō),kɔ̀ŋ
			sɔ́jɔlú,

branch except for Bobo and SWM. At the same time, the attestations of the root
*pu/fu are not limited to South-Eastern and extend to a number of the Western
branches such as Bobo, SWM, Susu (and possibly Manding-Mokole, assuming
that its reflex denotes tens in compound numerals). Isolated forms attested in
South-Eastern and in peripheral Western languages are noteworthy.

The reconstruction of *pu/fu for Proto-Mande and the interpretation of *tan
as the Proto-Western Mande innovation seem well-founded.

The etymology of *tan is obscure. Its similarity to the locally attested root
*tan (cf. Soninke tàán 'foot, leg'; 'wheel'; 'time' (when counting), Bozo Tieyaxo
tɔn 'foot, leg'; 'time' (when counting), Bozo Hainyaxo tǎ, Bozo Tiemacewe tawa,
Bozo Sorogama taba) is likely a coincidence. Lexical roots with the meaning 'foot'
are attested in NC numeral systems, usually as a basis for the non-compound
terms for 'fifteen'. The logic behind this development is simple: 'ten' is 'two
hands', 'twenty' means 'man', i.e. 'two hands and two feet', hence 'fifteen' is
'foot'. This seems to be the case for Boko and Busa, where a non-compound term
for 'fifteen' (gɛ̀̀o/ gɛ̀̀ro) is attested (hence '16=15+1' in these languages). This root
is etymologically related to 'foot, leg' in Duungoma (Samogo) gẽ, Dan gê̂ , Mano
gà (it should be noted that within Mande a non-compound root for 'fifteen' is
also attested in Ligbi, cf. tígán / tiga '15', tígá-ló '16').

In addition, a similarity to the term for 'one' as attested in some of the lan-
guages must be a coincidence.

A hypothesis assuming a semantic shift *NC *tan* '5' > Proto-Western-Mande *tan* '10' in parallel with the development of the Mande innovation *dúuru/ sɔ́ɔ́ru* 'five' seems to be a better explanation.

It bears reminding that the Bokobaru root *kuri* 'ten' (cf. also Boko *kúúli* recorded by Koelle) has a direct parallel in the isolated Bangime language (*kúrɛ́*).

0.9.11 'Twenty'

Table 0.150: Mande stems and patterns for '20'

Manding	<'human'?		
Jogo-Jeri			ɟālāmà/kèlèmó
Mokole	<'human'?		
Vai-Kono	<'human'	10*2	
Susu	<'human'		
SWM	<'human'?	10*2	
Bozo-Soninke		10*2	
Bobo			kpòró, cɔ́rɔ̀
Dzuun (Samogo)	<'human'		fwɛ́
Jowulu			kɔ̃ne/kɔnninŋ
SE-Eastern		10*2	kèè-/ka
SE-Southern	<'human'[20]	10*2	yɔ

There is every reason to believe that the term for 'twenty' was based on the lexical root(s) meaning 'human person' at the Proto-Mande level. The etymology of some of the isolated forms presented in the table should be sought with this in mind.

---

[20]Mende *núú ɠbɔyɔ́ngo* '20' ('person finished'). https://mpi-lingweb.shh.mpg.de/numeral/Mende.htm

0.9.12 'Hundred'

Table 0.151: Mande stems and patterns for '100'

Manding	*kɛ̀mɛ́	
Jogo-Jeri	čĕmé/tʃímí	20*5
Mokole	kɛ̀mɛ	
Vai-Kono	kɛmɛ	
Susu	kɛ̀mɛ́	
SWM	kɛmɛ(ŋ)	Kpelle: <'head' (ŋwúǹ)
Bozo-Soninke	kame/keme	'islam'-60
Bobo		ɟɔ̄(lì)/zɔ̀(lɔ́)
Dzuun (Samogo)		20*5, 80+20
Jowulu		'rope'*5
SE-Eastern		*20*5
SE-Southern	*kɛ̀mɛ́?	kë̆ŋ/kã̀ĩ́, la/lú

The root *kɛmɛ*, widely attested throughout Western Africa, is noteworthy. Its original semantics deserve a separate study: it is well known that in some languages this root can be used for 'sixty' or 'eighty' and not for 'hundred' (the archaic Bamana counting system: *màninkɛ̀mɛ* '60', *bámanankɛ̀mɛ / kɛ̀mɛ* '80', *kɛ̀mɛ ní mùgan* '100' (80+20)) (**Vydrin2015**: 360).

0.9.13 'Thousand'

Table 0.152: Mande stems and patterns for '1000'

Manding	wúlú/ wúli	wáa/ wá/ wà/ wága	bà
Jogo-Jeri	búlí, wúlú (< manding)		
Mokole		wàa/ wá/ waga	
Vai-Kono	wúl		
Susu	wúlù/ wúlì		
SWM	wùlù	wála/ wáá	
Bozo-Soninke	gulu	waxa	('islam')-muso,wúdzǜnè
Bobo			
Dzuun (Samogo)		gbà˻à, baa	bi 'goat', 800+200, <juula
Jowulu		wa�a�	800+200
SE-Eastern		wàà '200'	200*5,vûû, ˻dúú, pàdí, pə, boro
SE-Southern	wúlù/ wlǚ/ gblǚ (?)	*wágá: wáá	kpi , kɛn

The roots for 'thousand' attested in the Mande languages were borrowed from by the Western African languages. The original meaning of the Mande root *wáa/ wága* may be 'a basket of cola nuts' (Perekhvalskaja, **Vydrin2015**: 361), cf. Bamana *wágá* 'panier à colas', Bobo *wágá* 'panier qui sert à transporter les colas ou wòlōwágá.'

***

The table below gives an overview of Mande forms and patterns that will be used for further comparison to the evidence of other families (Table).

Table 0.153: Numerals in Proto-Mande

1	do, kelen	7	wɔ-X-fila ('hand'+2?)
2	pila/fila	8	seki/segi (<'plus'-3?)
3	sakpa/sagba/sawa, ʔààkɔ̃/yààká?	9	kònonto/kɔ̀nɔndɔ(n) (10-1, 5+4)
4	náání/nɑ̃ɑ̃i	10	pu/fu, tan (< *'5'?)
5	dúuru/sɔ́ɔ́ru, wo? ko? **tan? (> '10'?), nṹ?	20	<'human'
6	wɔrɔ (wɔ-rɔ? 'hand'+1?), t(s)um?	100	kɛmɛ, 20*5
		1000	wulu, wa(g)a

0.10 Mel

A narrow definition of the Mel family is preferred here (in accordance with the classification of the Atlantic languages suggested in (**PozdniakovSegerer2017**). This family comprises two compact language groups, namely Northern (Temne, Landuma, and all Baga languages except for Baga Fore and Baga Mboteni, namely Baga Koba, Baga Maduri, Baga Sitemu and others) and Southern (Kisi, Sherbro, Mani, and Krim). Sua, Limba and Gola are not included within the Mel family and are viewed as isolated NC languages. The numeral systems of the two Mel groups comprised of the distant languages are treated separately below.

0.10.1 Southern Mel

Table 0.154: South Mel numerals

	Kisi	Sherbro	Bullom	Mani (Bullom So)	Krim
1	pìlɛ̀ɛ́/pilɔ, *pum?	bul	(nim)-bul	nìm-búl	yì-mo̠
2	díŋ/C-íŋ/C-ɔ́ŋ,danyõ	tɪŋ	(nin)-tsiŋ/tiŋ	nìn-cɔ́ŋ	yì-ɣɪn/yèèn, dím
3	ŋg-àá/y-àá	ræ	(niin)-ra	nìn-rá	yì-ɣa/gàà
4	hìɔ́ɔ́lú	hyo̠l	(nii)-hiɔɔl	nìŋ-nyɔ́l/-nyɔ́l	yì-hĭo̠n
5	ŋùɛ̀ɛ́nú	mɛn	(nii)-man	nìmán < niN-wán?	yì-wɛn/n-wén
6	5+1	5+1	5+1	5+1	5+1
7	5+2	5+2	5+2	5+2	5+2
8	5+3	5+3	5+3	5+3	5+3
9	5+4	5+4	5+4	5+4	5+4
10	tɔ́	wāŋ	waan	wàm	wāŋ/wàn
20	bídìí(ŋ)/bélé	'finished it is man'	u-tɔɔŋ	ù-tɔ̀ŋ	<'person'
100	< Mande	< English		pé, < Susu	
1000	< Mande	< English		< Susu	

Noun class markers are usually positioned as suffixes in Kisi. At the same time, the first numerical terms in this language have noun class prefixes, which makes the forms look inconsistent, cf. *mùúŋ/ mìɔ́ɔŋ / ŋìɔ́ɔŋ / dìíŋ, tìɔ́ɔŋ/là-tìɔ́ɔŋ* 'two'.

The terms for 'hundred' and 'thousand' were probably absent in Proto-South-Mel. The similarity between Kisi *tɔ́* 'ten' and Bullom-Mani *tɔ̀ŋ* 'twenty' is noteworthy. 'Twenty' may follow the pattern '20=10PL'. If so, the original *tɔ̀ŋ* 'ten' should be viewed as an early borrowing from Western Mande (*tan* '10'). In this case, *wan* '10' is an innovation (probably based on *wan/wen* 'five') that developed in South Mel after Kisi had separated. The numeral system of modern Kisi exhibits no significant changes from the forms described by Koelle. It includes the form *ŋam-puum* '6' (Tucker Childs: *ŋɔ̆ŋpúm*) that may have retained an archaic

allomorph of 'one' (*pum*). The forms that will be used for further comparison are summed up in the table below (Table **??**).

Table 0.155: Proto-South Mel numeral system (*)

1	pìlɛ̀/pilɔ (< *lɛ/lɔ?), bul, mɔ	7	5+2
2	tsiŋ/tiŋ	8	5+3
3	ra	9	5+4
4	hiɔl	10	5PL? , < *West Mande?
5	wan/wen	20	'person', 10PL?
6	5+1	100, 1000	absent

0.10.2 Northern Mel

A higher degree of homogeneity observable in these languages allows an instant reconstruction of their numeral system at the Proto-Nothern Mel (Table **??**)

Table 0.156: Proto-Northern Mel numeral system (*)

1	-in	7	5+2
2	-rəŋ	8	5+3
3	-sas	9	5+4
4	-ŋkɨlɛ/-nlɛ	10	tɔfʌt (< tɔ-f-ɔt?)/pu , wɨtʃɔ?
5	kə-ṭamaṭ (< * kə- ṭa 'hand'?)	20	10*2, kə-gba (< *bay/bey 'chief'?)
6	5+1	100, 1000	absent

0.10.3 Proto-Mel

The table below gives an overview of South Mel and North Mel forms (Table **??**).

Table 0.157: Proto-Mel numeral system (*)

1	-in,< *lɛ/lɔ?	7	5+2
2	díŋ/tsiŋ/tiŋ, -rəŋ	8	5+3
3	*tat (> sas, ra)	9	5+4
4	hiɔl, -ŋkɨlɛ/<-nlɛ?	10	*pu/fu, 5ᴘʟ?
5	wan/wen, <'hand'	20	'person', 10ᴘʟ?
6	5+1	100, 1000	absent

0.11 Atlantic

Our step-by-step reconstruction of numeral systems in the Atlantic languages will be based on their classification suggested in **PozdniakovSegerer2017** (forthcoming) that distinguishes two main groups within the Atlantic family, namely Northern and Bak.

0.11.1 Northern

The numeral systems of Northern Atlantic are treated below by sub-group.

0.11.1.1 Cangin

Table 0.158: Proto-Cangin numerals (*)

1	no	7	5+2
2	nak	8	5+3
3	haj/ʔéeyə	9	5+4
4	nik-iɭ < *nak-iɭ?	10	sabbo (< Fula), da:ŋkah
5	jat (<'hand'), ʔi:p	20	10*2
6	5+1	100, 1000	< Wolof? Fula?

Some of the reconstructions presented above are not immediately apparent and are in need of additional commentary. A detailed discussion of each of them

would be impossible here, so we will take the reconstruction suggested for 'four' (*nik-il̩*) as a sample.

At first glance, the forms of 'four' attested in the Cangin languages have nothing in common. Two of the five Cangin languages have *kinil* 'four' (Ndut-Palor), whereas in the remaining three (Laala, Noon, and Safin) *nikis* is used in this function. The easiest solution to the problem would be to postulate two alternative forms for this group. However, as the evidence of comparative-historical phonetics suggests, the final **-l** in Ndut-Palor regularly corresponds to the final **-s** in Laala-Ndut-Safin (Table **??**).

Table 0.159: l ~ s regular correspondence in Cangin

-l̩	'eye'	'black'	'road'	'four'
Ndut	ʔil	suul	wal	kinil
Palor	ʔil	suul	waal	kinil, enil
Laala	kɔs	*susus	was	nikis
Noon	kwas	*sujus	waz	nigis
Safin	xas	*suzus	was	nikis

This fact alone urges closer examination of the forms quoted above. Further analysis shows that a fossilized noun class prefix **kV-** is present in some of the Palor numerals, cf. ***ka**-nak* 'deux', ***ke**-jek* 'trois', ***ki**-nil* 'quatre', ***ki**p* 'cinq. At the same time, the suffix -**Vs** is observable in the Noon numerals, cf. *jet-**us*** 'five'. This evidence combined suggests the following development of the forms for 'four' (Table **??**):

Table 0.160: Development of **nik-Vl̩* '4' in Cangin

Proto-Cangin	***nik-Vl̩**		
Laala/Noon /Safin	*nik-**Vs**		**nikis**
Ndut/Palor	***ki**-nik- Vl̩	**ki**-nik-il	**kinil**

0.11.1.2 Nyun-Buy

Numerical terms are highly divergent within this sub-group, so it seems reasonable to treat them by branch (Table **??**).

Table 0.161: Nyun-Buy numerals

	Nyun	**Buy (Kobiana, Kasanga)**
1	duk	tee(na), -anɔʔ
2	nak	naŋ
3	lal	taar
4	ren(d)-ek	sannaŋ
5	ci-lax (<'hand'), -məkila	ju-roog (<'hand'?)
6	5+1	5+1
7	5+2	5+2
8	5+3	4+4
9	5+4	5+4
10	ha-lax (<'hands')	5PL, ntaajã
20	<'king'	< Mande, 10*2
100	< Mande	< Mande, < French
1000	< Mande	ŋ-kontu < Portuguese[21]

The pattern '5'='hand' ~ '10'='hands' is immediately apparent in Nyun. In the case of Buy, it can be accepted only under the assumption that the derived term for 'five' became phonetically distant from its source form, cf. Kasanga *ji-rek*, Kobiana *ji-hak* 'hand' (these forms must be related to Nyun *ci-lax* 'hand'). In any case, the Kasanga term *ŋaa-roog* follows the pattern '5PL' that uses the same plural noun class as the one attested in *ŋa-rek* 'hands'.

The forms for 'ten' attested in Joola Ejamat (Atlantic Bak) *si-ntaaja* is important for the diachronic interpretation of the Kobiana form *ntaajã*. The evidence suggests that the latter was probably directly borrowed from Joola[22] (as was *-anɔʔ* 'one').

0.11.1.3 Jaad-Biafada

The forms of 'one' (*ɲi/ nɛ*) are distinguishable in the compound numerals, cf. Jaad *ŋka-inɛ* '6' ('5+1'), Biafada *mpaaji nyi* '7' ('6+1'), etc. The term for 'five' goes back to the lexical root meaning 'hand' (Biafada *gə-bəda*, Jaad *ko-bəda*).

---

[21]Guillaume Segerer (p.c.).

[22]According to Guillaume Segerer (p.c.) it is possible that the Ejamat and Kobiana forms both come from Manjak.

Table 0.162: Jaad-Biafada numerals

1	nnəmma, *ɲi/nɛ/-inɛ, -kkã	7	5+2, 6+1 (< Manjak)
2	ke, ma-ae	8	5+3, wose/wase
3	jo/tʃaw	9	5+4, leberebo
4	n(n)e/nnihi	10	(p)po
5	bəda (<'hand')	20	10*2
6	5+1, paaji (< Manjak), ŋka-?	100, 1000	< Fula

0.11.1.4 Tenda

The reconstruction of the Proto-Tenda numerals (K.Pozdniakov, ms) is based on a comparative analysis of five Tenda languages: Basari, Tanda, Bedik, Bapen, Konyagi.

Table 0.163: Tenda numerals (*)

1	ɓɑt, ndi/riye/diye/iye, mbɔ	7	5+2
2	ki	8	5+3
3	taʈ	9	5+4
4	næ̀x	10	poxw
5	mbəɗ (<'hand'), cɔ/njɔ	20	10*2
6	5+1	100, 1000	< Fula, < Mande

The etymology of the Konyagi term for 'five (*mbəɗ*') is based on the Jaad-Biafada evidence (these languages belong to the same sub-group as Tenda).

0.11.1.5 Fula-Sereer

The numerical terms are highly divergent within this sub-group, so it seems reasonable to treat them by language (Table **??**).

The fact that the Seerer terms covering the sequence from 'two' to 'five' have the same final segment is noteworthy. This could potentially be interpreted as a special morpheme or as a sub-morpheme that resulted from alignment by analogy. This discussion will be resumed below. Here it can only be stated that the

---

[23]Reviewing my first version of the book, Guillaume Segerer has advanced a new interesting etymology for Fula: *jow-i* '5' = *jun-ngo <jow-ngo* 'hand'. His hypothesis is quite possible.

Table 0.164: Fula-Sereer numerals

	Fula	**Sereer**
1	goʔo	leŋ
2	ɗiɗi	ɗik
3	tati	tadik
4	na(y)i	nahik
5	jo(w)i[23]	ɓe-tVk
6	5+1	5+1
7	5+2	5+2
8	5+3	4+4
9	5+4	5+4
10	sapp-o	xarɓ-
20	noogas/noogay	10*2
100	teeme-	< Fula
1000	< Mande, < Hausa	< Wolof?

morphological analysis of the Sereer term for 'five' (*ɓe-tVk*) suggested in the table below is not immediately apparent and is thus debatable. Within this approach the element **ɓe-** is interpreted as a noun class prefix despite the fact that such a class is lacking in Sereer. Complex issues pertaining to the reconstruction of the term for 'five' will not be treated here. We shall only note that the plural animate class is reconstructable as **ɓe-** (class 2) in Proto-Fula-Sereer.

0.11.1.6 Wolof

Table 0.165: Wolof numerals

1	CL-enn	7	5+2
2	ñaar (< *CL-(X)aar)	8	5+3
3	ñ-ett (< *CL-(X)ett)	9	5+4
4	ñ-ent (< *CL-(X)en(i)t)	10	fukk
5	jurom	20	< 'person', 10*2
6	5+1	100, 1000	< Fula, < Mande

The Wolof term for 'one' exhibits the agreement in noun class, cf. *k-enn nit*

'one person', *g-enn garab* 'one tree', *f-enn* 'somewhere', *l-enn* 'something', etc. The same can be applied to the terms covering the sequence from 'two' to 'four' as demonstrated in **Pozdniakov2015**: 82. Nothing is known about the original radical of the root (assuming there was one) since it was replaced by a noun class consonant.

Speaking of 'twenty', it should be said that the form *nit(t)* (apparently related to the lexical root *nit* 'person') is widely used alongside the common Wolof pattern '10*2'.

0.11.1.7 Nalu-Baga Fore-Baga Mboteni

This sub-group is the most problematic within Northern Atlantic. Admittedly, the evidence pertaining to their classification as Northern is inconclusive. Moreover, the sub-group itself is highly heterogeneous, which affects its numeral systems as well. The pertinent data for each of these languages is provided below (Table **??**):

Table 0.166: Numerals in Nalu, Baga Fore and Baga Mboteni

	Nalu	**Baga Fore**	**Baga Mboteni**
1	deːndɪk	ki-ben	mbɔ́
2	bi-lɛ	ci-di	sà-lɛ́
3	p-aat	ci-tɛt	n-dɛ́r
4	bii-naaŋ	ci-nɛŋ	í-nà
5	teedoŋ (< tɛ́ 'hand'?)	su-sɑ(n)	ì-rìβɛ̆, *ba(x)?
6	5+1	5+1	5+1
7	5+2	5+2	5+2
8	5+3	5+3	5+3
9	5+4	5+4	5+4
10	5*2, *a-lafaŋ?	ɛ-tɛ-lɛ (<'hands'+2)	tèn (< '*hand'?)
20	10*2	10*2	10*2
100	m-laak	bɔ-1	< Mande
1000	m-ɲaak (100pl?) < Susu	tɛngbeŋ-1	?

0.11.1.8 Proto-Atlantic North

The prospects for the reconstruction of the Proto-North Atlantic numerals are discussed below.

0.11.1.8.1 'One' (Table **??**)

Table 0.167: Numerals for '1' in Northern Atlantic

Cangin		no		
Nyun				duk
Buy		nɔʔ		tee(na)
Jaad-Biafada	*ɲi/nɛ			nnəmma,pakkã
Tenda	di(ye)		mbɔ	bat
Fula-Sereer	leŋ			goʔo
Wolof	-enn			
Nalu	deendik		mbɔ́	ki-ben

Isolated forms are quoted in the rightmost column. Direct parallels to some other forms are attested in Cangin – Buy (*nɔʔ*) and Konyagi – Baga Mboteni (*mbɔ*). The most common root is **di(n)/ li(n)/ ye(n)/ ne(n)* (assuming that these forms are related).

0.11.1.8.2 'Two', 'Three' and 'Four' (Table **??**)

Table 0.168: Numerals for '2'-'4' in Northern Atlantic

	'2'	'2'	'2'	'2'	'3'	'3'	'4'	'4'
Cangin	nak					haj	nik-iɭ < nak-iɭ?	
Nyun	nak				lal			ren(d)-ek
Buy	naŋ				taar			sannaŋ
Jaad-**Biafada**			ke			jo/caw	n(n)e(hi)	
Tenda			ki		taʈ		nə̀x	
Fula-**Sereer**		ɗik			tati(k)		na(y)i(k)	
Wolof				X-aar	X-ett		X-en(i)t	
Nalu		di/lɛ			tɛt/tat		naaŋ/ nɛŋ/ na	

The forms of 'two' in Tenda-Jaad-Biafada can be explained as a shared innovation, since these two branches belong to the same sub-group. The forms quoted in the two leftmost columns could be related, but the pertinent evidence is inconclusive. The roots **nak* and **di(k)* are reserved for further comparison.

As in the majority of other NC branches, the terms for 'three' and 'four' (tentatively recorded as *taʈ* '3' and *nak* '4') are fairly consistent in North Atlantic. Thus it appears that the terms for 'two' and 'four' are the same (or phonetically similar) across the languages of this branch. Cangin is the only language that does not comply with the additional distribution, because in the case of Cangin both terms are reconstructed as *nak. Interestingly, the form of 'four' bears a suffix, hence it could potentially be explained as a derivative of 'two'. At the same time, the root *nak* 'four' is reminiscent of one of the most persistent NC roots with this meaning.

In Jaad-Biafada we find the root *jow/caw* '3'. This is undoubtedly an innovation in the group which is represented by a remarkable isogloss. This is therefore an argument in favour of interpreting this group as part of the northern branch of the Atlantic family: Biafada *-njo / bíí-co/ bií-yo* '3', Jaad *ma-cao/ ma-caw/ má-cɔu* '3'. It is possible that we are dealing with an ancient borrowing of Proto-Jaad-Biafada from Mande (from *saba* 'three').

In theory, it is possible that forms attested in the Cangin languages (*ka-hay / * ʔe-jɛʔ*), also originated from the Mande form (likely weakened to *habi / hawi*).

In this case, we find either reflexes of the Proto-NC form *tath* or borrowings (taking into account very ancient forms) – from the Mande languages in numerous Northern Atlantic languages.

0.11.1.8.3 'Four'

The root *na(h)i-k* can be securely reconstructed for Proto-Northern Atlantic. As has been demonstrated above, the initial **ñ-** of the Wolof term is a reflex of a noun class prefix that replaced the initial radical of the root. The final -t in the Wolof term probably resulted from the alignment by analogy with the term for 'three' that ends in -t, cf. *ñ-eenk* ? → *ñ-eent* '4' by analogy with *ñ-ett* '3'.

0.11.1.8.4 'Five' (Table ??) and the terms from 'six' to 'nine'

Table 0.169: Numerals for '5' in Northern Atlantic

Cangin	jat (<'hand')		ʔi:p	
Nyun	ci-lax (<'hand')			-məkila
Buy			ju-roog	
Jaad-Biafada	bəda ('hand')			
Tenda	mbəɗ (<'hand'?)	co/njo		
Fula-Sereer		jo(w)i	* ɓe-tVk	
Wolof		jurom		
Nalu	teedoŋ/*tee ('hand'?)		ribə(l)	su-sa(n), *ba(x)?

The North Atlantic languages are characterized by the term for 'five' being systematically derived from the lexical root meaning 'hand'. Interestingly, this development seems to post-date the replacement of the original root for 'hand' by an innovation in the majority of the branches. At least four independent formations of this kind are attested within eight branches (cf. the evidence quoted in the leftmost column of the table). Both Tenda and Jaad-Biafada terms for 'five' are of common ancestry: they seem to have developed from the root *bəda at the Proto-Jaad-Biafada level, since both languages belong to the same sub-group. This probably indicates that the pattern based on the term for 'hand' was used in the languages that belong to the Northern group at the proto-level (possibly as an alternative to the inherent NC root for 'five'). In view of this, the formal alterations of 'five' are easily explained as those automatically caused by the replacement of the inherent term for 'hand' by an innovation. As we hope to demonstrate in the next chapter, the derivational pattern 'hand' > 'five' is surprisingly rare in the NC languages. It is barely attested, for example, in Benue-Congo, thus being characteristic of the North Atlantic languages (and the Atlantic languages on the whole, see below).

In view of this, the reflexes of the inherent NC root for 'five' could have been preserved in only a minority of North Atlantic branches. The roots *jo/ co, *tVk/ rog and *rib/ ʔi:p unrelated to the term for 'hand' deserve special attention within this context.

The pattern '5+' ('hand'+) can be securely reconstructed for the terms covering the sequence from 'six' to 'nine'. The uncommon pattern '7=6+1' attested in

Biafada was borrowed from one of the Manjak languages (Atlantic Bak), as was the derived term for 'six' (*mpaaji*).

0.11.1.8.5 'Ten' and 'Twenty' (Table **??**)

Table 0.170: Numerals and patterns for '10' and '20' in Northern Atlantic

	'10'	'10'	'10'	'20'	'20'	'20'
Cangin			< Fula, da:ŋkah	10*2		
Nyun		<'hands'			<'king'	
Buy		5PL	ntaajã	10*2		< Mande
Jaad-Biafada	(p)po			10*2		
Tenda	pəxw			10*2		lapɛm
Fula-Sereer			sapp-o, xarɓ-	10*2		noogas/ noogay
Wolof	fukk			10*2	'person'	
Nalu		5*2	*a-lafaŋ?	10*2?		

With the evidence of the three branches, the reconstruction of the term for 'ten' (tentatively recorded as **pok*) seems secure. Its attestations are admittedly limited, apparently due to its replacement with derived terms based on 'five' ('hand'). This reconstruction is also supported by the presence of the final velar: as we have seen, it is reconstructable in a number of other numerical terms at the proto-level.

The pattern for 'twenty' is reconstructable as '20=10*2'. Particular derivates based on the typologically widely attested patterns ('20' <'person', 20 <'king') seem to have formed independently.

0.11.1.8.6 'Hundred' and 'thousand'

The evidence points to the absence of these terms in Proto-North Atlantic. Attested forms are borrowings from 'influential' languages such as Fula, Wolof, Manding, Hausa (in the case of Niger Fulfulde). Interestingly, the terms in question are already borrowings in some of these source-languages.

Proto-North Atlantic numeral system (Table **??**)

Table 0.171: Proto-North Atlantic numeral system (*)

1	di(n)/li(n)/ye(n)/ne(n), mbɔ	7	5+2
2	di(k), nak	8	5+3
3	taṭ	9	5+4
4	nak	10	pok
5	<'hand', jo, tVk/rog, rib/ʔiːp	20	10*2
6	5+1	100, 1000	absent

0.11.2 Bak

0.11.2.1 Joola languages

Over a hundred sources covering the numeral systems of fifteen major Joola dialects have been made available to us courtesy of Guillaume Segerer. His collection of evidence may be labeled a 'dialect atlas' of numerical terms. These terms often exhibit significant variations not only in their phonetics but in the inventory of lexical roots as well[24] . The name Joola pertains to a group of at least seven related languages (including Bayot). A study of their numeral systems may help set a clearer distinction between these languages. Moreover, it might shed some light on their (hitherto unclear) internal classification.

Numerical terms as attested in ten major Joola languages are discussed below.

0.11.2.1.1 'One' (Table ??)

Table 0.172: Joola numerals for '1'

Bliss Banjal	Kasa Mlomp	Fogny Karon	Keeraak Ejamat	Bayot Kwaatay
-anɔʔ	-anor	-anor	-anor	
-anor	-anor	-anor	-anor	
	(akon)	əkon		(akon)
	(ta)			don
			yinka, (sia)	fɛnɛŋ

---

[24]I wish to express my gratitude to G.Segerer for his assistance with regard to the dialectal attribution of sources.

The main form is reconstructed as **-anor*, with the initial vowel forming a part of the root. The only languages where this root is not present are Bayot (*don* '1') and Kwaatay (*fɛnɛŋ* '1'). The root *əkon* with a vocalic opening (sporadically attested in Kasa and Bayot) is found in Fogny alongside **-anor*.

0.11.2.1.2 'Two', 'three' and 'four' (Table ??)

Table 0.173: Joola numerals for '2'-'4'

Bliss Banjal	Kasa Mlomp	Fogny Karon	Keeraak Ejamat	Bayot Kwaatay
'2'				
si-lubəʔ	si-łubɣʔ	(liba)	sɪˈsubə	ʔi-ɾigəʔ/ tɪgga
si-rubə	sɪ-subəl	su-supək/ ɕi-ɕipəkʰ	si-luːbɜʔ	sɪˈsubə
'2'				
	si-gäbä, (ku-mɛntɛn)	si-gäbäʔ		
si-gabaʔ			si-gäbä	
'3'				
si-həəji	si-hɣːɟiʔ	si-feegiir/ si-fe:ɟiʔ	sɪ-həːjɪ	i-fiigiʔ/ i-fəəʒi
gu-fɪːgɪr/ si-fɣɟiɾ	sɪ-həːjɪl	si-həːciːl	si-həəji, (fu-fooateen)	ki-hɣːɟiʔ
'4'				
si-bäkir	si-bäːkiʈ/ si-bäkiʔ	si-bäkiɾ/ si-ba:ci:r	si-bacir	sɪ-bɐɣɪr
si-baagir	sɪ-bacɪl	ɕɪ-päkil/ si-ba:ci:l	si-bäkir	ki-bäkir

Two alternative roots for 'two' are attested in Joola, namely **si-łubəʔ* and a relatively wide-spread **si-gabaʔ*.

The term for 'three' goes back to *si-feegir, with its reflexes being attested in all dialects.

The term for 'four' is securely reconstructed as *si-bääkiɾ.

0.11.2.1.3 'Five' and 'ten' (Table ??)

Table 0.174: Joola numerals for '5' and '10'

Bliss Banjal	Kasa Mlomp	Fogny Karon	Keeraak Ejamat	Bayot Kwaatay
'5'				
hu-tɔk	hu-tɔkʰ	fu-tɔk/ u-sɔk	hu-tɔk	o-to/ ɔ-ɬɔ/ ɔ-rɔ
fu-tɔk		ɪ-ɕäkʰ/ i-sak	fu-tɔk/ hu-ʂok	hu-tɔk
'5'				
	(naa-suan) ŋaa-suwaŋ			
'5'				
		*fu-tam		
*tən				
'10'				
ku-ŋɛn <'hands' gu-ɲɛn <'hands'	ku-ŋɛn <'hands'	ku-ŋɛn <'hands'	ku-ŋɛn <'hands' ku-ŋɛn <'hands'	
'10'				
				gu-tie(pɔkɔ) 'hands' su-moŋu/ su-ŋɔmu 'hands'
	sɛ-bɛɛs 'hands'	ŋaa-suwan		

The Banjal form **tən* (reconstructed on the basis of the compound numerical terms) and the (related?) Fogny form *fu-tam* attested in a source dating to the seventeenth century (**dAvezac1845**) are of special interest.

The Mlomp form of 'five' (sporadically attested in Kasa as well) is identical to the Karon form for 'ten' (*ŋaa-suwan* in both cases). The etymology of these forms is unclear. At the same time, the majority of the forms for 'ten' (but not for 'five' as in the majority of the North Atlantic languages) go back to the lexical root meaning 'hands'. To illustrate this point, the lexical stems for 'hand' in the Joola languages are quoted in the table (Table **??**):

As can be deduced from the presentation above, at least four lexical roots for 'hand' that serve as a basis for the terms for 'ten' are distinguishable in Joola. Interestingly, the source roots and the numerical terms that depend on them are not necessarily the same within a language. The main root is **ku-ŋɛn/ ku-ɲen* '10' <'hands'. At the same time, *bɛɛs* 'hand' yields *sɛ-bɛɛs* 'ten' in Mlomp. This derivative is not attested in in Kasa and Karon where *bees* 'hand' alternates with *ŋɛn/ ɲen* 'hand'. The base **ka-ʈe* 'hand' attested in Bayot and Kasa yields *gu-tie-* in Bayot. Finally, *ɛ-mɔŋu* 'hand' > *su-moŋu* 'ten' in Kwaatay (also *ɛ-ŋɔmu* 'hand' > *su-ŋɔmu* 'ten' with a metathesis).

As noted above, the root *ɛ-ntaaja* attested in Keeraak and Ejamat was possibly incorporated into Kobiana (North Atlantic). This root, admittedly very rare in the Joola cluster, is the only primary one for 'ten' and as such it deserves special attention (especially in view of its later replacement with the derivatives based on 'hand').

0.11.2.1.4 'Twenty', 'hundred', and 'thousand'

Two apparent derivational patterns are used for the term for 'twenty' in the Joola languages:

<'king':   Bliss *a-yuɣ*, Banjal *ə-vi/ə-vvi*, Kasa *a-yi/ ɔ-ji*, Karon *əwi*, Bayot *ə-y*;
<'person':   Kasa *an / bu-k-an*, Fogny *ka-banan* 'person finished'.

In Kwaatay the term for 'twenty' is based on 'mouth' (*bu-tum-an*).

The terms for 'hundred' and 'thousand' are borrowings from Mande or 'influential' Atlantic languages (often either Fula or Wolof) in the majority of the dialects, cf. *keme/teme* '100', *wuli, juni* '1000'.

In conclusion it should be added that the Joola terms covering the sequence from 'six' to 'nine' follow the common pattern '5+'.

Table 0.175: Joola stems for 'hand'

Bliss Banjal	Kasa Mlomp	Fogny Karon	Keeraak Ejamat	Bayot Kwaatay
'hand'				
ka-ŋɛn(ak)	ka-ŋɛn	ka-ɲen(ak)/ ka-ŋɛn	ka-ŋɛn	
ga-ɲen/ ka-ɲen(ak)		ka-ɲɛn	ka-ŋɛn(ak)	ka-ŋyɛn(ak)
' **'hand'**				
	e-bɛɛs			
ɛ-pɛs	ɛ-bɛɛs	ɛ-pɛs/ ɛ-bɛs		
'hand'				
				ɛ-mɔŋu/ ɛ-ŋɔmu
'hand'				
	ka-seʔ			ka-te/ ga-te/ ʈe/ kə-se
'hand'				
bu-lɛhɛj		ɛ-lɛcɛs 'upper arm'		
'hand'				
bi-lɛfɛj			bu-lɛfec 'inner hand'	
'hand'				
ka- ʂɛɲum(əku)			kə-ləɲum 'hand'	

0.11.2.2 Manjak languages

This branch is represented by three closely related languages (Manjak, Mankanya, Pepel). Numerical terms attested in them are presented in the table below (Table ??):

Table 0.176: Manjak numerals

1	lɔɔl(e)/lɔŋ	7	6+1, jand/jaanʔ/ cand (Pepel)
2	-təb/-təw, -puguʈ/pugus (Pepel)	8	4PL, koas/ʊʌs
3	wa-(y)anʈ/wa-jenʈ/ jens	9	10-1, (8+1)
4	baakər/wakər	10	5PL ('hands'), (n)taaja/taaya, taim (Pepel)
5	ɲɛɛn ('hand')	20	10*2
6	paagi/paaji	100	< French
		1000	kʊnt

As can be gleaned from the table, the Manjak stems for numerals are very different from those attested in Joola. At the same time, morphological and lexical evidence strongly suggests that these two branches are genetically the closest and belong to the same Bak sub-group.

This implies that the numeral system of one of these branches must have undergone systematic innovations. We will reserve our conclusions until the evidence from the other Bak sub-groups, i.e. Balant and Bijogo, is reviewed.

0.11.2.3 Balant

Despite the fact that Balant is usually treated as one language, we will present the evidence of Balant Ganja and Balant Kentohe separately (Table ??), because the difference between these two idioms is of key importance to our study.

The opening sequence of the Ganja terms is quoted according to **CreisselsBiaye2015**. They form the most reliable part of the presentation. A few remarks pertaining to the differences in these Balant dialects are in order. First of all, the Balant Kentohe terms for 'one', 'two', 'three' and 'six' exhibit a final homorganic nasal of uncertain origin. The forms attested by Koelle in the 19th century sources suggest that we are dealing with a morpheme **-n** not assimilated to a preceeding consonant by point of articulation. Secondly, Koelle's evidence speaks in favor of 'six' being a base for a larger group of numerical terms. According to him, not only 'eight' and 'nine' but also 'ten' followed the pattern '6+'.

Table 0.177: Balant numerals

	Balant Ganja	Balant Kentohe
1	hɔ́dà/wɔ́dā/-ɔda, bɔ́ɔ́díbɔ́/wɔdibɔ (counting)	-ɔɔdn/ho:dn/fóóda
2	sìbí/-sebe	-sɪbm/-sebm/g-ʃííbn (**Koelle1963**)
3	hàbí/yààbiī̀	-habm/káábn (**Koelle1963**)
4	tàllá/tàhàlā	-tasla/tahla/táʃiila (**Koelle1963**)
5	jìíf/jéèf	cɪf/'-cef/kiif ~ ciif (**Koelle1963**)
6	fááj/faac	mfaacɲ/faad (**Koelle1963**), 5+1
7	6+1	6+1, 5+2
8	táhtállà/tāntàhlā (4 redupl.), 6+2	5+3, 6+2 (**Koelle1963**)
9	jíntàllá/jīntàhlā (5+4)	5+4, 6+3 (**Koelle1963**)
10	jímmín/jīnmīnn (<5?)	cɪfmɪn/f-cef meen (<5?), 6+4 (**Koelle1963**)
20	10*2	<'person'
100	gèmɛ́/kɛmɛ (borrowed)	<'5 persons'
1000	wílí (borrowed), kont	f-ko:nti

0.11.2.4 Bijogo

Let us examine an analysis of the Bijogo numeral system found in (**Segerer2002**). According to him, the term for 'one' is *nɔɔd* ('cette forme est retenue pour l'énumération abstraite', ibid. 171). His interpretation of *-**d** as the only true reflex of the etymon (with other segments ensuring the grammatical agreement) is immediately convincing, cf. the following examples quoted by him (ibid. 171):

(2) a. *o-to ɔ-nɔɔd* 'a person'
     b. *e-booɟi ɛ-nɛɛd* 'a dog'
     c. *u-gbe u-nɛɛd* 'a road'
     d. *ka-jɔkɔ n-ka-d* 'a house'
     e. *ŋɔ-katɔ ŋ-ŋɔ-d* 'a fish'.

Segerer justly observes that 'La forme générale de l'élément ayant pour valeur 'un (autre)' est donc (**V**)-**n**-**pC**-**d**, où **pC** est le préfixe de classe du nom déterminé' (ibid. 171).

He also quotes the form *dideeki* 'seul' (var. *deeki* 'tout seul'). A variant of this form probably appears as *èɗìgɛ́/ nɛ́ɛ́digɛ/ módiigɛ* 'one' in Wilson and Koelle.

Table 0.178: Bijogo numerals

	Bijogo Kagbaga (Bubaque)	**Bijogo (other dialects)**
1	n-ɔɔd (*-d)	
2	n-somb (Segerer, p.c.), n-sombɛnʈ	sòòbɛ́/súngb/cuuwɛ, ndank (Kamona)
3	ɲ-ɲɔ-ɔkɔ (<'fingers')	
4	ya-agɛnɛk	
5	n-de-ɔkɔ (dɛ 'to finish', -ɔkɔ 'hand')	nu-duβ-ɔkɔ (Kamona)
6	5+1	
7	5+2	
8	5+3	
9	5+4	
10	n-ruakɔ (ru 'to rise', -ɔkɔ 'hand')	
20	o-joko ('person'), -ansak-o-to ('to finish'+'somebody')	ŋɔjɛt oto (Kamona), **Koelle1963**: ría̰akɔ̃ɔ̃to/ŋórembaʃóóto
100	20*5	
1000	kuntu	

As demonstrated by Segerer, the term for 'three' (*ɲ-ɲɔɔkɔ*) is a Bijogo innovation of a cultural origin, cf. sg *ɲɔ-ɔkɔ* - pl of *nɔ-ɔkɔ* 'finger' (dim. *<kɔ-ɔkɔ* 'hand'): 'Un roi bijogo ne se déplace jamais sans l'attribut symbolique de sa fonction, consitué par une sculpture de bois et de corne … Cet objet, nommé u-ran kɔ-ɔkɔ, represente une main à trois doigts' (ibid. 172). It should be noted that this root is attested in all Bijogo dialects and is already accounted for by Koelle (*-ɲɔ́ɔ́gɔ*).

As established by Segerer, the same root is attested as *ɔkɔ* in the terms for 'five' and 'ten'.

0.11.2.5 Proto-Bak

Now we will compare the Bak numerals.

0.11.2.5.1 'One' (Table **??**)

Table 0.179: Bak numerals for '1'

Joola	**don**	-anor, əkon, fɛnɛŋ, yinka, (sia), (ta)
Manjak	lɔɔl(e)/**lɔŋ**	
Balant		-ɔdaʔ
Bijogo	***d**	-ed̪ìgɛ

A comparison of the terms quoted in the leftmost column yields the form that can be tentatively recorded as **don*. The rightmost column gives an overview of roots attested in only one out of four branches.

0.11.2.5.2 'Two' (Table **??**)

Table 0.180: Bak numerals for '2'

Joola	si-ɬubəʔ	si-gabaʔ
Manjak		-təb/-təw, pugut̪/pugus
Balant	sɪbɪ/-sebe	
Bijogo	sòòbɛ́/súngb/cuuwɛ	

The leftmost column presents the root attested in three sub-groups. It is traceable to **ɬubəʔ.*

0.11.2.5.3 'Three' and 'four' (Table **??**)

For the first time in our step-by-step analysis of numeral systems in the numerous NC families we observe the existence of a separate root for 'three' in each of the branches of a language group.

The term for 'four' exhibits an isolated Joola-Manjak innovation as well as isolated innovations in Balant and Bijogo.

Table 0.181: Bak numerals for '3' and '4'

	'3'	'4'	'4'
Joola	si-feegir	si-bääkiʈ	
Manjak	wa-(y)anʈ/wa-jenʈ/jens	baakər/wakər	
Balant	habi/yabi		tasala/tahala
Bijogo	ɲ-ɲɔ-ɔkɔ (<'fingers')		ya-agɛnɛk

0.11.2.5.4 'Five' (Table **??**)

Table 0.182: Bak numerals for '5'

Joola		fu-tɔk, tən?, ŋaa-suwaŋ? (cf. '10')
Manjak	ɲɛɛn ('hand') (cf. Joola '10')	
Balant		jùíf/jéèf
Bijogo	n-de-ɔkɔ (dɛ 'to finish', -ɔkɔ 'hand')	

The pattern 'hand' > '5' is traceable within two branches. However, the roots involved are different in each case. Numerous isolated forms are grouped together in the rightmost column.

The terms from 'six' to 'nine' (Table **??**)

Table 0.183: Bak numerals and patterns for '6'-'9'

	'6'	'6'	'7'	'8'	'9'
Joola	5+1		5+2	5+3	5+4
Manjak		paagi/ paaji	6+1, jand/ jaan?/ cand	4PL, koas/ ʊʌs	10-1, (8+1)
Balant		fááj/ faac	6+1	4 redupl., 6+2	6+3, 5+4
Bijogo	5+1		5+2	5+3	5+4

The form *paag/paaj* 'six' is a common Manjak-Balant isogloss[25] . It is not

---

[25]Guillaume Segerer is right to note (p.c.) that the Manjak-Balant form *paag-* '6' may be ralated to Joola *-feegir/-hɔɔji* '3'

surprising that the primary term for 'six' attested in these languages served as the basis for the '7=6+1' pattern. This pattern received further development in Balant where it was employed for terms up to 'ten' (i.e. '10=6+4') according to the 19th century sources. At the same time, the archaic pattern '8=4PL'/'8=4 redupl.' is attested in these languages alongside the pattern '8=6+2'.

0.11.2.5.5 'Ten' (Table **??**)

Table 0.184: Bak numerals for '10'

Joola	ε-ntaaja[26]	ku-ŋɛn/ ɲɛn 'hands'	'hands' (bɛɛs, moŋu/ ŋɔmu, tie)	ŋaa-suwan
Manjak	(n)taaja/ taaya		5PL ('hands')	taim
Balant				jímmín, 6+4
Bijogo			n-ruakɔ (ru 'to rise', -ɔkɔ 'hand')	

In addition to the common pattern '10 = 'hands'', both branches share a common root (*ntaaja*) that could be interpreted as a shared Proto-Joola-Manjak innovation.

0.11.2.5.6 'Twenty', 'hundred' and 'thousand'

The term for 'twenty' is based on the lexical root meaning 'person' in all of the branches (except for Manjak, where it was replaced with the pattern '20=10*2'). The same development is observable in Balant Ganja as well.

The terms for 'hundred' and 'thousand' are most likely borrowings. However, the origin of *kont*/*kunt* 'thousand' attested in three of the Bak branches deserves special discussion (in North Atlantic this root (*ŋ-kontu*) is found in both of the Buy languages).

Overview of the Bak numerical terms (Table **??**).

---

[26]The stem is attested only in Joola Feloup, so, it seems to be borrowed from Manjak.

Table 0.185: Bak numerals

1	don/lɔŋ, -anor, əkon	7	6+1, 5+2, jand/jaanʔ/ cand (Pepel)
2	łubəʔ, -təb/-təw, -puguʈ/pugus	8	4PL/4 redupl., ʊʌs
3	feegir, yanʈ/jenʈ, habi/yabi	9	5+4, 10-1, 6+3
4	baakər/wakər, tasala/tahala	10	5PL ('hands'), (n)taaj, taim, -suwan
5	'hand', tɔk, tən?	20	'person', 10*2
6	paag/paaj, 5+1	100	borrowed
		1000	kʊnt (borrowed?)

0.11.3 North Atlantic and Bak Atlantic numerals in the comparative perspective

It should be stressed that the Atlantic family is among the most divergent within Niger-Congo. Some of the numerical terms in both of the Atlantic groups exhibit a variety of forms potentially explained as Proto-NC reflexes. Moreover, the comparative evidence presented in Tables 3.225 (Proto-North-Atlantic) and 3.239 (Proto-Bak-Atlantic) points to the near total absence of common roots present in both groups. The only exception to this is the root *tɔk/ tVk* 'five'.

In view of this, the only available solution would be the study of the Atlantic evidence within a wider NC context (i.e. in contrast to the reconstructions available for other NC families). A comparison of the intermediate reconstructions within the macro-family will be offered in the next chapter.

0.12 Isolated languages vs. Atlantic and Mel

According to the traditional classification outlined in **Sapir1971**, Limba, Sua and Gola belong to the Atlantic languages. However, as we tried to demonstrate in **PozdniakovSegerer2017** (forthcoming) this hypothesis is as ill-grounded today as it was half a century ago.

An overview of the pertinent data for each language is presented in the tables below.

0.12.1 Sua

Table 0.186: Sua numerals

1	sɔn	7	5+2
2	cen	8	5+3
3	b-rar	9	5+4
4	b-nan	10	tɛŋi
5	sɔŋgun	20	10*2
6	5+1	100	kɛmɛ
		1000	uŋ-kɔntu

0.12.2 Gola

Table 0.187: Gola numerals

1	guùŋ	7	5+2
2	tì-yèe/tī-el/cel	8	5+3
3	taai/tāāl	9	5+4
4	tii-nàŋ	10	zììyà
5	nɔ̀ɔ̀nɔ̀ŋ	20	kpὲ(w)ùŋ
6	5+1	100	20*5
		1000	< English

0.12.3 Limba

Table 0.188: Limba numerals

1	ha-nthe	7	5+2
2	ka-le/kaa-ye	8	5+3
3	ka-tati	9	5+4
4	ka-naŋ	10	kɔhi
5	ka-sɔhi	20	10*2
6	5+1	100	kɛmɛ, wuli (borrowed)
		1000	wulu (< Mande)

The chapter 3 includes 250 tables presenting the evidence by group, branch or sometimes a dialect of a certain language. Among them are summary tables that provide an overview of the numerical terms in twelve major families of Niger-Congo and in a number of isolated languages. Our attempt at reconstructing the Proto-Niger-Congo numeral system on the basis of this comprehensive evidence will be presented in the chapter 4.

a community proofreader or typesetter
at http://www.langsci-press.org/register.