

NILO- SAHARAN



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IS NIGER-CONGO SIMPLY A BRANCH OF NILO-SAHARAN?

Roger Blench

INTRODUCTION

From an early period, scholars have noticed a series of resemblances, both lexical and phonological, between the African language phyla today called Niger-Congo and Nilo-Saharan. The outlines of an argument for the coherence of Niger-Congo may be traced to Westermann's (1927) 'Die westlichen Sudansprachen', while we owe the recognition of Nilo-Saharan to Joseph Greenberg (1966, 1971). However, as early as 1911, Westermann had joined the two together in his first synthesis of lexical data, 'Die Sudansprachen' (Westermann 1911). Edgar Gregersen (1972) put forward both morphological similarities and a series of lexical isoglosses as evidence for a macro-phylum for which he proposed the name 'Kongo-Saharan', and conjoin Niger-Congo and Nilo-Saharan.

Creissels (1981) listed the many morphological and lexical similarities between Mande and Songhay to raise doubts about the cohesion of Niger-Congo and Nilo-Saharan. These similarities are striking, numerous and clearly cannot be explained by chance convergences. However, Creissels' examples seem to conflate ancient forms and (assuming the hypothesis presented here is correct) shared innovations. For example, Creissels (1981:316) notes the similarity between Songhay *kúurú* and Mandinka *kùlu* for 'skin/hide'. However, Gregersen pointed out in 1972 that similar forms were recorded widely

through both phyla and that therefore this root is to be regarded as reconstructed to a hypothetical proto-language (see Appendix 1).

This theme was further pursued by Nicolai (1984) whose study of the origin of Songhay listed many more 'rapprochements' between Mande and Songhay as well as systematically exploring the links with Saharan. More recently, Nicolai (1991) has established the comparison with Tamazight and claims that the language may have begun as Berber before being Mande-ised. The conclusion, that Songhay evolved as a creole used for intercommunication, certainly explains the deep penetration of loan-words, but the argument for dismissing the Nilo-Saharan affiliations is still opaque.

Not all authors have agreed with the methods or evidence used to support the existence of such a large macrophylum. Boyd (1978) used the numerous overlapping glosses in languages from different phyla in northern Cameroun to question the methodology of classification. More recently, Cloarec-Heiss (1992), in a study of the shared isoglosses of Banda (Ubangian) and Central Sudanic has raised similar queries.

In order to discuss the hypothesis, the text must refer to it before any proof is offered. This seems an appropriate point to propose a new name for the macro-phylum, Niger-Saharan. Gregersen's 'Kongo-Saharan' has been occasionally used, but it joins together the two second terms in the conventional names and gives a misleading impression to non-specialists of the location of the families. Proto-Niger-Saharan would then be abbreviated PNGS to contrast it with Proto-Nilo-Saharan (PNS).

There has been relatively little further progress on the development of the Niger-Saharan hypothesis, in part because the expansion of data has made the whole project more difficult to encompass. Scholars such as Bender (1981) projected such a unification, although only hinting at the evidence. In part, also, simply demonstrating the unity of Nilo-Saharan has not proved easy; shared innovations to demonstrate the unity of the phylum are elusive¹, and some scholars remain dubious over the inclusion of families such as Kado and Kuliak.

¹Or at least published tabulations of evidence are lacking

By the time the data since 1978 began to be analysed, the hypothesis was already speculative and made the project more difficult. The demonstration suggested that the lexical similarities in the case of certain basic items was more than could be accounted for by chance. However, he made no proposals for a genetic or historical schema to account for this situation. If Nilo-Saharan and Niger-Congo are to be put together then it should be possible both to list the common features and specific nodes that support the hypothesis. This in turn should provide a key to assigning one phylum to a specific place in the genetic tree of the other.

This paper² argues that Niger-Congo and Nilo-Saharan are genetically related and should be regarded as a single macrophylum. The working hypothesis is that Niger-Congo should be classified as a single branch of Nilo-Saharan and that it is closest to Central Sudanic. Central and East Sudanic and the Kado languages seem to form a unit within Nilo-Saharan although their relation to the other parts of Nilo-Saharan is still unclear.

The evidence for this consists of phonological and morphological features common to both phyla, combined with lexical similarities. From these a genetic tree for the proposed macro-phylum can be derived. Finally, some conclusions are drawn about the implications for preliminary. The lexical evidence is given in detail in Appendix 1. Appendixes 2-4 discuss certain glosses that have been proposed, but which have to be rejected for various reasons.

METHOD

Evidence for such a broad hypothesis comes in three forms, phonological, morphological and lexical. Gregersen discusses morphological similarities, especially t/k alternation, at some length, but without any compelling conclusions. This is partly because many of the particles and morphemes are extremely short; vowel correspondences are uncertain and the case becomes difficult to make.

²I would like to thank Kay Williamson for her comments on three drafts of this paper. I am grateful to Lionel Bender and Chris Ehret for comments and suggestions on the text.

Nonetheless, the status of noun-class gender pairings in Niger-Congo has become clearer since Gregersen wrote, and there is a case for tracing the relevant affixes in Nilo-Saharan.

Morphology is often considered better evidence than phonological and lexical isoforms. Frequently, remnant morphologies are good evidence, as they are less likely to be borrowed. Arguments from phonology are the most problematic, since they depend on 'absence' arguments, i.e. phenomena deemed to be sufficiently rare in the world as to exclude or make unlikely their independent evolution in two adjacent phyla.

A major problem in the source material is the unevenness of available data. Niger-Congo is a far more coherent phylum with a useful number of lexical isoglosses and there is broad consensus among most researchers about its internal structure, as represented in Bender Samuel (1989). Nilo-Saharan is far more diverse and researchers have yet to clarify its exact membership, and are still far from agreeing on an internal subclassification. In the case of Niger-Congo, two major works of reconstruction, Westermann (1927) and Mukarovsky (1976: 7) provide massive series of comparative data. No comparable published data series exist for Nilo-Saharan and there are no significant proposals for Proto-Nilo-Saharan forms³.

A final methodological problem should be mentioned at this point; the probable existence of some pan-African isoglosses. To establish the status of the proposed lexical items they were also compared with Cushitic in the convenient form of Ehret's (1987) Cushitic reconstructions. There are a few striking isoglosses, most notably the word for 'fly/jump'. These are noted in the appendix and their methodological significance further discussed in section 5.

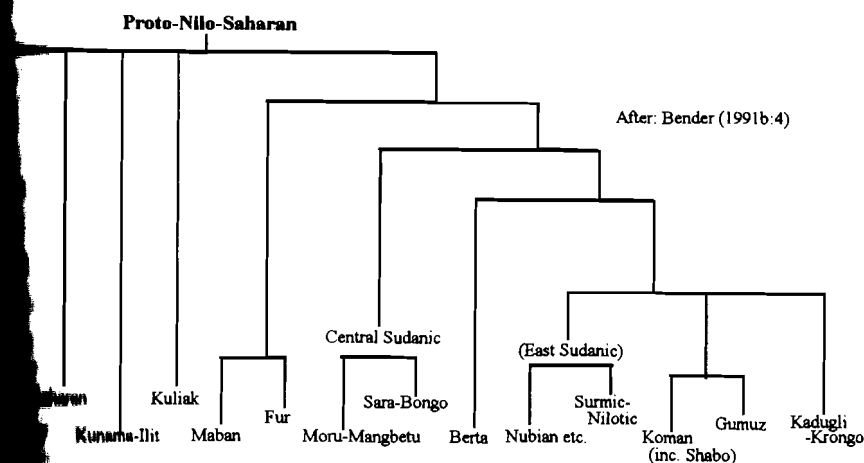
3. EXISTING CLASSIFICATIONS

Westermann (1911) was content with demonstration of affinity and did not propose an internal structure for the 'Sudansprachen'

³This statement should be qualified in the sense that both Christopher Ehret and Lionel Bender have major studies of Nilo-Saharan in draft form, so this lacuna may be filled in the next few years.

Greenberg (1966:130) sets out Nilo-Saharan with six co-ordinate branches. The most elaborate proposals for the subclassification of Nilo-Saharan have been developed by Bender (1976, 1989b, 1991b, 1991c). Bender bases his classification on grammatical isomorphs and shared innovations. The details of the classification remain to be fully worked out, but the essential is a split between the outliers (Songhay, Saharan, Kunama-Ilit and Kuliak) and the remaining languages (including the Sudanic languages, Nubian, Koman and the Kado (Kadugli-Krongo) languages. Figure 1 shows Bender's proposed structure;

Figure 1. Conventional Subgrouping of Nilo-Saharan



Bender includes the problematic Shabo in the Koman group following the arguments of Fleming (1991). A very different structure of Nilo-Saharan is proposed by Ehret (1989) but the evidence for this is unpublished and is difficult to assess.

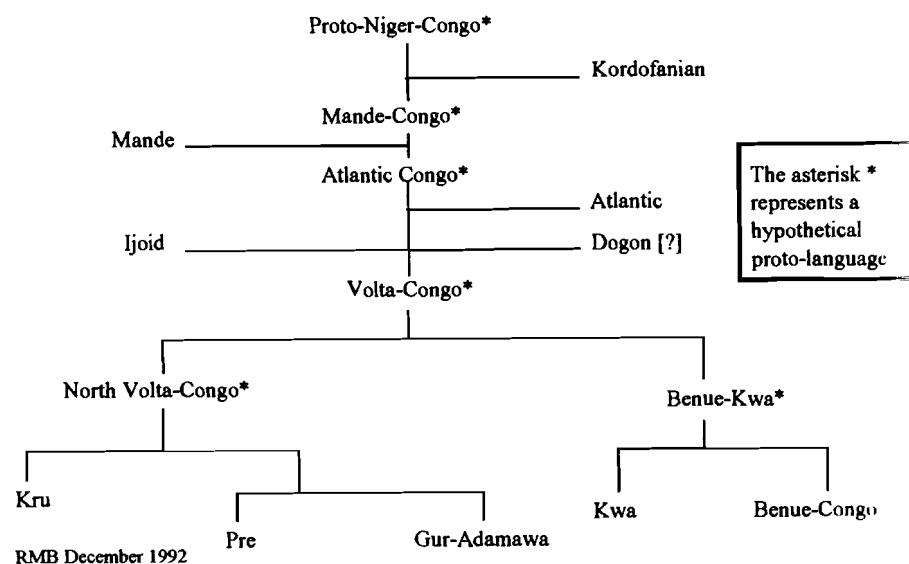
It is not the function of this paper to consider the internal classification of Nilo-Saharan in detail but to try to show how it is related to Niger-Congo. To that end, the classification put forward in section 6 is definitely a minimalist hypothesis that leaves most of Nilo-Saharan unclassified and concentrates on the position of Central Nilo-Saharan.

One of the most interesting controversies in the history of Nilo-Saharan classification relates to Kado. Greenberg (1966) originally conjoined it

with Kordofanian as the 'Tumtum' group but noted at the time that 'it shows considerable divergence'. Schadeberg (1981) questioned this classification and suggested a Nilo-Saharan affiliation. Matsushita (1984, 1986) was content to repeat Greenberg, but Dimmendaal (1987) argued this case in more detail after the publication of Reh's (1985) grammar of Krongo. Finally, Stevenson (1991) set out the case for Nilo-Saharan affiliation using unpublished lexical data. This argument is now generally accepted (i.e. in Bender 1991b) although the closer affiliations of Kado are still uncertain. Ehret (1992) has again raised the question of the relationship to Nilo-Saharan.

The internal structure of Niger-Congo is broadly agreed although doubt remains on the historical priority of several branches. Figure 2. shows the 'tree' of Niger-Congo, based on Bennett and Sterk (1977) and the contributions to Bendor-Samuel (1989) adapted and further developed using recent unpublished material.

Figure 2. The Principal Subdivisions of Niger-Congo



The most significant feature of this is that Kordofanian again becomes the primary branching of Niger-Congo, a reprise of Greenberg's original hypothesis. Although the links with the rest of Niger-Congo are still accepted, the weakness of much of the evidence

presented by Greenberg has meant that Kordofanian is very much the outlier of Niger-Congo.

PHONOLOGICAL EVIDENCE

There are two main pieces of evidence from the phonological inventory relating Nilo-Saharan and Niger-Congo; the vowel harmony systems based on +/- ATR and the prevalence of the labial-velars /kp/ and /gb/. Both of these are sufficiently rare in the world's languages as to make their co-occurrence striking. However, it is also notable that they are strictly confined to particular sub-groups, suggesting that they can be reconstructed to proto-languages and that areal spread should not be invoked.

EVIDENCE FROM VOWEL HARMONY SYSTEMS

The Distribution of ATR Vowel Harmony

Vowel-harmony systems have been reported from a number of language phyla of the world, most notably in Africa and in Uralic languages (Comrie, 1981:59 ff.). In Africa, however, there is a specific type of vowel harmony, usually characterised as Advanced Tongue Root (ATR) which contrasts with the labial-velar systems in Altaic. The phonetics of these systems have been described in some detail in Stewart (1967) and Lindau et al. (1972). The exact characterisation of these systems has been debated and it has been argued that the feature would be better described as expanded vowel space.

It is not my purpose to discuss the phonetic interpretation of these systems but simply to observe that it is present in both Nilo-Saharan and Niger-Congo languages. The + or - ATR vowels most commonly form parallel sets and these can usually be interpreted as erosion or expansion of an original 10-vowel set. The existence of original 5+5 systems is attested in both phyla which gives greater specificity to the claim that these systems are unique in the languages of the world.

The first attempt to compare the two phyla is Hall et al. (1974) which provides a useful table of examples of vowel harmony in Nilo-Saharan. However, their data was significantly defective, since they

claimed these systems existed in various families where they are now known to be absent. In the case of Koman [Coman], the study by Bender (1983b) eliminates this possibility. Similarly, they suggest there are 'traces' of these systems in Saharan -recent work on Kanuri-Kanembu, such as Hutchison (1981) does not support this. Maba vowel harmony is not evident in work by Edgar (1991) or Nougayrol (1989). Finally, they say there is 'probably' harmony in Fur -again this now seems unlikely (Jakobi 1990). After this slaughter of the innocents, three branches of NS are left with ATR vowel harmony, Central and Eastern Sudanic and Kado.

Hall et al. (1974:258-9) and Williamson (1989a:23-4) have reviewed the evidence for ATR vowel harmony in the branches of Niger-Congo. They do not mention Kordofanian, and unfortunately the evidence remains fragmentary (cf. Schadeberg 1989). In the case of Mande, there is now conclusive evidence for vowel harmony systems with nine vowels (Halaoui et al. 1983:39).

These are not recorded in this form elsewhere in the world⁴ and it would strain credibility to assume they arose independently. Their presence could be explained by areal diffusion except that their widespread attestation within specific branches of Nilo-Saharan makes it more likely that they should be reconstructed to the proto-phonologies.

4.1.2 Could a Vowel-Harmony System be Borrowed?

The short answer to this is that all aspects of language seem to be borrowable, but vowel harmony is relatively rare. Hall et al. (1974) cite the case of Somali (Cushitic), while the vowel harmony in Tangale (Chadic) is apparently recently adopted from Waja, a neighbouring Niger-Congo language (see Kleinewillinghöfer 1990, for a more recent discussion). These cases are conspicuous by their rarity, however, and the general suggestion is that vowel-harmony systems are fairly resistant to borrowing.

Hall et al. (1974) argue for borrowing since they seem unwilling to entertain the hypothesis of unity between the two phyla

⁴Hall et al. (1974:263) mention examples in Palaeosiberian and Nez Percé, but admit that these are not precisely comparable

They posit the direction of borrowing was from Niger-Congo to Nilo-Saharan, although their argument is essentially historical and not linguistic. They point out that the period at which borrowing occurred must have been extremely remote and the effects would thus be synchronically indistinguishable from an ancient retention. As the distribution of vowel harmony is quite restricted within NS, it may be an innovation at the level of Kado and the Sudanic/Niger-Congo languages -a hypothetical node here named Kado-Sudanic.

4.2 EVIDENCE OF LABIAL-VELARS

Two of the most striking phonemes characteristic of numerous African languages are the double articulations /kp/ and /gb/. These are found throughout Niger-Congo⁵ and in Central Sudanic (but not in the rest of NS) and they are absent from Afro-Asiatic and Khoisan. These sounds are otherwise extremely rare in the world's languages. Maddieson's (1984) compilation of the sound-systems of the world's languages lists only one example outside Africa, from the Pacific (although there are some others -see also Foley, 1986:61). In view of this, it seems to strain credibility somewhat to assume that the common presence of labial-velars in Nilo-Saharan and Niger-Congo is merely a coincidence and these very specific double articulations have simply formed up by chance in two adjacent language phyla.

Apart from independent evolution, there are two possible explanations:

1) they were loaned into Central Sudanic at an early period from adjacent Niger-Congo languages (presumably Ubangian)

2) they were formerly present in other NS groups but have been lost

It is unlikely that labial-velars were present in other branches but have all been lost without trace. An early loan from PNC into Central Sudanic cannot be discounted; only if there are other grounds for assuming that it is close to Niger-Congo can the explanation of a shared retention be adopted

⁵Although in only one language -Katla, of the Kordofanian group (Schadeberg, 1989)

5. EVIDENCE FROM LEXICAL ISOGLOSSES

Establishing lexical isoglosses is essentially a matter of cross-comparing large compilations of data. There are three primary sources for suggestions, Westermann (1911), Gregersen (1972) and Creissels (1981). These have been checked, new materials added and compiled into data tables showing comparative series.

The situation for basic data in the case of the two phyla is very disparate. In the case of Niger-Congo there are two major works setting out comparative data tables, Westermann's 'Die westlichen Sudansprachen' (Westermann 1927) and Mukarovsky's reconstructions of 'Western Nigritic' (Mukarovsky 1976-7). Greenberg refers the reader to Westermann for the evidence of the unity of Niger-Congo.

Both of these works have problems. Westermann Ijò and Adamawa-Ubangian as well as Kordofanian, whereas Mukarovsky deliberately omits these languages and Mande (which he is alone in considering as related to Afro-Asiatic). Nonetheless, they represent major compilations of data which make possible comparisons of widespread roots.

Nilo-Saharan is much less well-served, despite a major expansion of publication in recent years. Greenberg's comparative series are inevitably the starting point, although his 'Chari-Nile' is now generally discounted. Bender (1981, 1989b) has begun the process of seeking out isoglosses, although only the case for pronouns is set out in full. There are, however, a number of individual studies that can be used to establish comparative series;

Songhay	Ducroz & Charles (1978), Creissels (1981), Nicolai (1984)
Kanuri	Cyffer & Hutchison (1990)
Maba	Edgar (1991)
Fur	Beaton (1968), Jakobi (1990)
Central Sudanic	Greenberg (1966), Bender (1992, ined,a)
East Sudanic	Thelwall (1981), Fleming (1983a), Dimmendaal (1988),
Bender (ined,b)	
Kado	Matsushita (1984, 1986), Reh (1985)
Berta	Bender (1989c)
Kunama	Castellnuovo (1950)
Komuz	Bender (1983)
Shabo	Fleming (1991), Teferra (ined)
Kulak	Fleming (1989b)

The search for isoglosses shared between Nilo-Saharan and Niger-Congo has yielded two major results: items common through much of Nilo-Saharan also widespread in Niger-Congo, and a series of isoglosses that link Eastern and Central Sudanic, Kado and Niger-Congo. This supports the evidence from vowel harmony systems.

The lexical data is set out in Appendix 1. It is divided into two major sections; a series of general Niger-Saharan isoglosses and 'Niger-Congo-Sudanic' isoglosses. The evidence for Niger-Congo is generally presented in a more summary form, making use of existing reconstructions, *where these are supported by data tables*⁶.

There are certain words that have been previously suggested as possible isoglosses for Nilo-Saharan. However, these words are also found in parts of Afro-Asiatic. They are therefore probable ancient loan-words and their tendency to 'jump' phyla argues that they cannot be used as evidence for genetic classification. The three words considered here are 'fire', 'dog' and 'pig' (Appendix 2).

A comparison with reconstructions of Proto-Cushitic (Ehret, 1987) also produced a few common forms. The case of 'fly/jump' is especially striking as PC *pur- corresponds almost exactly to many NS and NC forms. There are two possible explanations, apart from coincidence;

- a) an early loan to or from PC
- b) a general tendency to form words for 'fly' in this way (cf. IE *volare*) through sound-symbolism

The second explanation is more attractive in many ways, simply because of the extra-African parallels. Appendix 3 considers the evidence for 'fly' and 'cough' in the perspective of external cognates. In the same way, Cushitic *fu 'blow' parallels forms in Niger-Congo, but it would clearly be dangerous to regard this as evidence for a monophylum or even an early loan.

There are sometimes disagreements between scholars as to the correct reconstruction, reconstructed forms should not be used as direct evidence *unless* the data tables contain similar forms that can be consulted by the comparativist.

The PNGS roots for 'knee' and 'tortoise' are also attested in Cushitic (see data tables). Since these do not appear to be Afroasiatic roots, they are most economically explained as loans into Cushitic, assuming that the dispersion and diversity of Nilo-Saharan is a reliable indicator of its antiquity.

6. REMNANTS OF NOUN-CLASS AFFIXES

One of the principal reasons why Kado (Kadugli-Krongo) was considered part of the Kordofanian cluster is the presence of alternating CV prefixes on nouns. Although Schadeberg (1981) has argued that these cannot be compared directly with Niger-Congo since they play a role in a gender system, it is also true that some of them look remarkably similar to Kordofanian prefixes (op. cit., 299) especially to Talodi. However, the relatively low level of lexical similarity between Kado and Kordofanian and the absence of convincing parallels for the CV alternation elsewhere in Nilo-Saharan inevitably suggests the speculation that these arose from borrowing.

However, in Central Sudanic and possibly beyond there are distinctive traces of an affix system apparently similar to Niger-Congo. One of the most notable class affixes that surfaces almost throughout Niger-Congo is the *ma-* single gender for liquids or mass nouns (see Greenberg 1966:10). In Kordofanian, the *ŋ-* classes for mass nouns correspond to *ma-* classes in other branches of Niger-Congo (Black and Black 1971:11, Schadeberg 1989:72). For this reason, Williamson (1989a:42) proposed a labial velar as the original initial consonant of the affix. In the case of Niger-Congo class 6A, this would be **ŋmá-*, giving the *ŋ-* and *ma-* by different routes.

Gregersen (1972:75) discusses this point but provides no evidence for the *ma-* affix, mentioning only the presence of the velar nasal in some forms for water. However, Stevenson⁷ noted that *ma-* is

present as an affix in a number of Central Sudanic languages, as a marker of mass or as a collective. However, if the *ma-* is accepted as also present in Nilo-Saharan, then such a reconstruction of initial **ŋm* would seem to be problematic.

Table 1 compiles these examples from East Sudanic and some other branches of Nilo-Saharan.

have been checked where possible against published material, but some are only quoted from his own field data

⁷In an unpublished note found among his papers after his death. I am grateful to Roland Stevenson's daughter Janet Ahmed for access to his material. The forms

Table 1. Evidence for a *ma-* affix for mass nouns in Nilo-Saharan

Language	blood	milk	water	beer	honey	oil	hair	salt
CS								
Bongo	tirama	māa	miml		kamba			mēlō
Mödö	rómā		mini		māāj			mīl
Yulu	māās		mēe(m)		imī			
Kresh	srāmā	mbamba ¹						
Bagirmi	mosu		man(e)					
Ngambay	mōso	mbā	mān					
ES								
Majang	yéróm		maw					mooi
Murle			maam			maal	iim	mele
Boya			mam	merfe				komo ²
Shatt	taam-ic	mem	mma		tum-ox	mit		
Nyimang						nyum		
Tamnin	monit		muŋ				nhiem	
Nuer	riem							
Bari	rīmā			mou				
Other NS								
Gumuz	māhā							
Opo-Shita	c'oma							

Notes:

1. The cognacy of forms with a prenasalised bilabial remains doubtful.

2. Probably an accidental resemblance, given the striking correspondence between Murle and Central Sudanic.

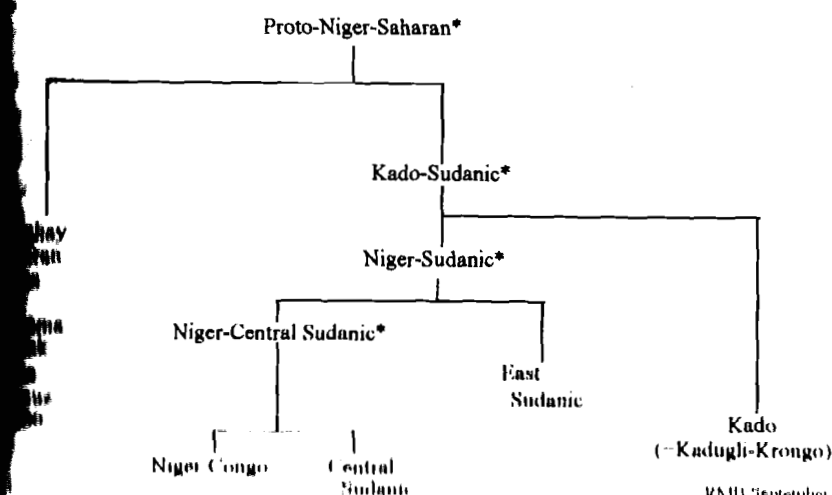
Examples of *ma-* outside Central and East Sudanic are somewhat thin and may perhaps be excluded as coincidence. The analysis of the *m-* as a remnant of a productive affix is its absence in cognates in closely related languages. For example, the Bongo word for water, *miml*, appears as *iml* in Baka. The attestations outside East and Central Sudanic may be genuine retentions, loans or accidental resemblances. If they are indeed regular cognates then this affix may be present through most of Nilo-Saharan.

7. NIGER-SAHARAN CLASSIFICATION

The evidence presented in the appendixes is intended to show that Niger-Congo and Nilo-Saharan are one and the same phylum. Williamson (p.c.) has suggested that 'Niger-Saharan' would be more appropriate than Gregersen's 'Kongo-Saharan' as it combines an element from each of the two current phylum names.

Assuming a Niger-Saharan phylum, Niger-Congo should then have split off from Nilo-Saharan at the same time as Central Sudanic, which would then be the group closest to Proto-Niger-Congo. Including the branches further away from Niger-Congo, a minimal 'tree' of Niger-Saharan can be constructed as shown in Figure 3.

Figure 3. Proposed Niger-Saharan 'tree': Minimal Hypothesis



This tree makes no hypothesis about the internal classification of the left-hand (Songhai to Shabo) grouping.

8. HISTORICAL IMPLICATIONS

Two historical conclusions are implied by these hypotheses;

- a) the component families of Nilo-Saharan are significantly older than Niger-Congo
- b) the homeland of Niger-Congo is probably significantly east of its usual suggested site

Assigning dates to language phyla is notoriously problematic and certainly no mechanical method such as glottochronology is likely to yield significant results. Nonetheless, it is tempting to try to correlate major periods of language evolution with ecological change.

In the past 20,000 years, the two principal events in the eco-history of Africa have been the beginning and end of the Holocene, an epoch of prolonged aridity, usually dated 20-12,000 B.P (Street & Gasse, 1981). This probably implies a hunting economy based on highly dispersed populations and may well be reflected in the present-day scatter of Nilo-Saharan subgroups and the deep divisions between them⁸. Intractable remnant languages such as Ongota, Laal, Ndeewe, Kujarke, Hadza and Sandawe probably are all relics of this period.

Evidence for cultural practices from the PNGS reconstructions is fairly limited. 'Turtle' and 'frog' seem to be present at a deep time level, arguing the importance of riverine resources. Poor lexical data means that the potential to reconstruct pan-African fish species such as tilapia is limited. So far, it has not proved possible to reconstruct the names of any hunting implements into Niger-Saharan. However, there is the possibility that 'canoe' will reconstruct to Niger-Central Sudanic. If this is correct, then this node may be identified with the gradual improvement in the climate after 12,000 B.P. The bow and arrow, which appears in North Africa by 11,000 B.P., reconstructs

⁸The well-known 'Aqualithic' theory of Sutton (1974-1977) fails because the evidence it uses is too late to apply to Nilo-Saharan

convincingly back to Proto-Mande Congo and no further. Interestingly, there is no comparable reconstruction possible for the more scattered Nilo-Saharan, suggesting major dispersal took place before the technology spread south of the Sahara.

Previous writers, noting the concentration of families in West Africa, have tended to assume a location somewhere near the headwaters of the Niger and explained Kordofanian by the migration of a single group. If the present classification is accepted, it becomes far more likely that the homeland was in the centre of present-day Sudan and that Kordofanian represents the Niger-Congo speakers who stayed at home.

9. CONCLUSION

The idea of a Niger-Saharan macro-phylum has been present in the background of African classification studies, but few scholars have made use of it, generally staying with the phyla proposed by Greenberg. However, the evidence for a Niger-Saharan now seems too difficult to ignore. The argument of this paper is Niger-Congo is the branch of Nilo-Saharan most closely related to the Central Sudanic languages. There is a parallel with Greenberg's placing of Bantu as a single branch of Benue-Congo and the initial resistance this excited from Bantuists. Researchers in both Niger-Congo and Nilo-Saharan must now consider the detailed implications of such a conjunction.

A wide-ranging hypothesis of this type should be viewed more as a stimulus to further research and revision than as a completed schema. There are still major gaps in the descriptive literature as well as an absence of detailed lexicons of some of the key languages. Moreover, as noted above, it is extremely difficult at this great time-lag to distinguish between true genetic affiliation and extensive borrowing. Nonetheless I hope this paper will be considered a beginning.

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PNS	Proto-Nilo-Saharan	
PSN	Proto-Southern Nilotic	Rotland, 1982
PVC	Proto-Volta-Congo	
PWN	Proto-Western Nigritic	Mukarovsky, 1976/77 ¹⁰
PWS	Proto-West Sudanic	Westermann, 1927
V	Vowel	

I have adopted the convention for reconstructions used in the Niger-Congo volume edited by Bender-Samuel (1989), distinguishing those established by regular sound-correspondences from those derived by quick inspection of cognates. By this criterion, most major reconstructions are 'pseudo-reconstructions' (inevitably). The effect of this is to translate the starred forms of various writers to hache '#'

Other Terminology

To shorten the rather clumsy term 'Kadugli-Krongo', Roland Stevenson originally proposed 'Kado' a term for people in many languages of the group. This has been adopted by Bender and is used in this paper.

APPENDIX 2

The following examples are set out to provide some justification for the tree proposed above. They are arranged in sets of Nilo-Saharan and Niger-Congo forms. Where a gloss has been discussed previously, I have referred to the authors in acronyms above the table. The table of acronyms preceding the introduction should be used with the glosses.

Where possible I have cited the reconstructions of Westermann (PWS) and Mukarovsky (PWN) as these direct the reader to tabulation of numerous individual forms. I have tried to add forms from language families omitted by these authors -so for PWN I have tried to find Kordofanian, Mande and Adamawa-Ubangian attestations whereas I have tried to add Kordofanian for PWS. I have also assigned their reconstructions to the relevant node on the Niger-Congo 'tree' thus Westermann's PWS is assigned to PMC' Proto-Mande Congo

Sometimes these authors did not uncover cognates in the families they did search and I have tried to add these. The references after each pseudo-reconstruction are to guide the reader to existing references - however, I have often replaced the citations proposed by these authors with more recent or more convincing examples.

Greenberg did not propose any speculative proto-forms and indeed it is sometimes difficult to imagine the shape of the item he proposes to link the individual forms. For ease of reference, I have proposed pseudo-reconstructions in the text, marked with a '#'

Proto-Niger-Saharan

VkV 'arm, hand, shoulder' (C.:315, Gr.:80, G:133)

Saharan	Zaghawa	ba	
Berta	Berta	θa'ba	
ES	Didinga	iba	
CS	Bagirmi	boko	upper arm
	*PWS	-buak-	
Bantu	*PB	*-boko	

apparently attested in Kordofanian where another root something **-gin**, identified by Greenberg (1966:153), is dominant. Creissels (1981:315) compares a set of words referring to a root #kamba which commonly means 'shoulder', though these are probably distinct.

¹⁰PWN is approximately equivalent to P'Al

#-bale 'two, twins' (Gr.:88, W.:204)

NS	Shabo	Shabo	bab(a)
NS	Komuz	Gumuz	mban
NS	Kunama	Kunama	baare
NS	ES	Nubian	bar (-si)
NS	ES	Teso	iba (-nit)
NS	Maban	Aiki	mbà
NC	Mande	Mwan	plɛ
NC	Atlantic	Nalu	bele
NC	Ijoid	Ijo	ma-
NC		#PWS	#-bà-

The persistence of the bVr/IV sequence through both phyla is especially striking. The prenasalized bilabial in C₁ position in both Gumuz and Aiki argues that this is an old NS feature. If the Ijoid forms are cognate then the nasality also survived into Niger-Congo. No attestation in Kordofanian at present.

#buru 'hole, hollow' (G.:122,140, G.:84)

NS	Kunama	Kunama	aburr	
NS	Berta	Berta	ful	sound-hole
NS	CS	Mödö	'bóró	hole in tree
NS	CS	Mangbetu	polo	
NS	CS	Ngambay	bòlò	hole in tree
NS	ES	Lango	bur	
NS	Saharan	Daza	bolo	
NC	Ijoid	*PI	*opokolo	
NC	PAC	#PWN	-kholo-	'hole, hollow'
NC	Gur	Buli	gor-o (-a)	
NC	BC	Nupe	gbòrǒ	

Greenberg cites 'boro' for Berta 'hole' a much more convincing cognate, but this finds no confirmation in Bender's (1989c) lexical data

#bulu 'white' (G.:23,160, Gr.:88, W.:279)

NS	Saharan	Kanuri	bûl
NS	Berta	Berta	fuudí
NS	Fur	Fur	pota
NS	Maban	Maba	fàfàràk
NS	ES	*PD	*papaR
NS	ES	Nuer	bor
NS	Kado	Krongo	ofiro
NC	Kordofanian	Gom	abóré
NC	#PMC	#PWS	pù-
NC	Atlantic	Wolof	fur
NC	Mande	Mende	puru

It is ironic that 'white' appears to provide a good PCS isogloss, while 'black' most certainly does not (see Appendix 4 'rejected forms'). Westermann (1981:163) gives a number of useful comparative forms for Western Sudanic. Also used by Schadeberg (1981:297) in his discussion of the classification of Kadugli. Although Westermann does not construct a second syllable a lateral in C₂ position his data shows it present in all branches of Mande-Congo.

#le 'tongue' (C.:316, G.:146, 159, Gr.:88)

	Komuz	*PK	*let'
	Songhay	Songhay	dèenè
	Saharan	Kanuri	tó-lam
	ES	*PEN	*na-dyep
	CS	Baka	dèndènè
	Maban	Maba	delmi(k)
	Kordofanian	Talodi	loge
	Mande	Busa	léná
		PWS	#-lima
	Bantu	*PB	*-deme

Koman forms are assumed to be a metathesis of the 'del' forms with d → t, whereas the initial laterals in Niger-Congo are presumably a

weakening of d→l. The only confusing factor are the Saharan forms which raise the possibility of the deletion of the dV- prefix. This is one of the most satisfying PCS glosses as the word occurs in a remarkably similar form throughout both families.

#goro 'throat, voice, neck'

NS		Fur	Fur	gorogoro	throat
NS		CS	Aja	koroko	
NS		CS	Logbara	ogoro	neck
NS		CS	PCS	#Gol-r	neck
NC	Kordofanian		Moro	lo-gor (pl. ɲo-)	throat
NC		BC	Gurmana	gorogoro	nape
NC	Adamawa		Mumuye	kórò	windpipe

Reconstructed by Bender (1992:35) as an isogloss for Central Sudanic, but clearly a very widespread root. Williamson (1989b:253-254) gives a proliferation of forms within Benue-Congo.

#kaN- 'thorn' (D.:60, G.:126)

NS	Songhay	Songhay	kardyi	
NS	Komuz	Anej	aak	
		Twampa	káakà	'sharp'
NS	ES	*PN	*ku-kua	
NS	CS	Mangbetu	koko	
NS	CS	Fer	kúnj	épine
NC	Atlantic	Bedik	ge-kwósv	
NC	Gur	Seme	kəme	
	Gur	Gulmance	konkon-u (-i)	
NC	BC	Nupe	ekā	
NC	Bantu	*PB	-igua	(Bourquin, 1923:45)

This is an interesting root, recognised by Greenberg as diagnostic for the Sudanic languages but not as a widespread NS root. Similarly, in Niger-Congo, there is no recognised reconstruction. Mukarovsky

(1976-77, Root 171) has a somewhat different reconstruction **#ghwuni**, which does however, retain the velar in C₁ position. There are scattered attestations of a nasal consonant in C₂ position in Niger-Congo as well as in Central Sudanic, making this a possible innovation at the Congo-Central Sudanic node.

#kaNa 'to count' (Gr.:81, D.:35, Williamson, 1989b:256)

NS	Kunama	Kunama	kala	
NS	ES	Bari	ken	
NS	ES	Proto-Daju	*ngan-	
NS	CS	Fer	kíl-	compter
NC	Kwa	Twi	-kàŋ	
NC	Ijoid	*PI	*kɛ	

This word later came to have the meaning 'read' in many languages.

#kili 'charcoal'

NS	Komuz	Komo	k'is'is'i	?C
NS	Saharan	Kanuri	kálgimi	
NS	Maban	Maba	kikimi-k	
NS	CS	Fer	kùl'	charbon
NS	CS	Bongo	kílílí	
NC	PMC	*PWS	*-kal-	

This word clearly has a complex etymological history. Although the **#kili** forms are not necessarily directly cognate with the other **#kili** forms, the existence of the Kanuri form seems to link them. The probable history of this is that there are at least two separate roots in **#killi** and **#gimi** which were compounded in Kanuri. The Kanuri form may also not be a true cognate, but have instead borrowed the first element from Niger-Congo. Westermann has attestations for the second syllable in almost every Niger-Congo family. This root also occurs in Chadic, although it is likely to be a loan-word from Kanuri, on distributional grounds.

#ko 'to go' (C.:318, Gr.:83, W.:241)

NS	Kuliak	*PK	*k'au or g'au	
NS	Songhay	Songhay	koy	
NS	Kunama	Kunama	ka	
NS	Maba	Kodoi	kəko	
NS	Kado	Katcha	kəlo	
NS	ES	Murle	ako	
NS	ES	Omotik	-kaawe	
NS	CS	Mangbetu	oku	'go away'
NS	Saharan	Zaghawa	-ke	
NC	Mande	Sembla	kə	
NC	West Atlantic	Kissi	kə	
NC	PMC	#PWS	*kua, kuali	

The set proposed by Westermann has almost exclusively a labial-velar in C₁ position and usually has a second lateral consonant. It may therefore be unconnected. Discussed by Fleming (1983b:444) who adds additional Eastern Sudanic material.

#koro 'round, circle'

NS	Saharan	Kanuri	korkór	circle
NS	Fur	Fur	kərola	round (pl.)
NS	ES	Nyimang	agwəɽəŋ	circular
NS	ES	Murle	gorgor	round, spherical
NS	CS	Mödo	gúrúgúrú	in a circle
NC	Kordofanian	Moro	gereðeðo	to be round
NC	Kwa	Twi	kurukuruwa	round
NC	BC	Nupe	kuru	circular

Stevenson (1981:157) first drew attention to the cognates of this form within East Sudanic languages.

#kuru 'tortoise, turtle' (C.:321, Gr.:88, G.:159)

Komuz	Kwama	k'ukiʃ	turtle
Songhay	Songhay	nkura	
Saharan	Kanuri	kúdúkareá	
Maba	Aiki	káb(ú)rùdà	tortoise
ES	Dinka	le-kur	
CS	Bongo	kándá	small turtle
CS	Ma'di	okù	tortoise
Kadugli	Krongo	-kòòŋ (ní-)	
Kordofanian	Masakin	(k)əɾə	
Mande	Mandinka	kùtu	
	*PWN	-kwúlu	
Bantu	*PB	-kulu	

The diversity of the forms attested may reflect the fact that different languages may have compound names (see the Kanuri and Aiki forms). It is of some historical significance that turtle/tortoise is the only item of this set to be widely attested in Niger-Saharan. Greenberg cites parallels in Kordofanian and also Keiga, now classified as NS. However, there are also Beja *sekuur* 'tortoise'.

#ku 'House, single room' (G.101,122, Gr.84, W.:244)

Komuz	Opo	ku
Maba	Mimi	kuluk
ES	Dilling	kəl
CS	Yulu	gúù
CS	Kresh	koyo
PMC	#PWN	#-ku(a)
Mande	#PM	#koN-
Atlantic	Wolof	kör
Gur	Bariba	ku-ru

Greenberg and Gregersen put together the words for place and into a single set. #ku for 'place' is certainly widespread in Nilotic languages, although there are no attestations in Niger-Congo. The two

sets are provisionally separated in this reconstruction. The Proto-Koman ***khub** is confusing as a bilabial shows up nowhere else in C₂ position and suggests that this was added in Koman. Westermann (1927:244) did not reconstruct a lateral in C₂ but there are several dispersed examples in Niger-Congo that correspond to the Nilo-Saharan examples. I have added a nasal to Dwyer's Mande reconstruction as it is attested in various branches of Mande. Stevenson (1991:365) restricts his series to 'house' but reconstructs // **lá(k)** and adds a set that is not necessarily related -Tama 'wall' Nyimang 'wel' etc.

#**kulu** 'knee' (B.:261, Gr.:82,84, G.:101,123, M.:II:223)

NS	Shabo	Shabo	hutu/kutti
NS	Koman	Kwama	dugul
		Opo	kwajen
NS	Berta	Berta	gufuŋ
NS	Kunama	Kunama	tùgà
NS	Maba	Mesalit	kàdínó
NS	Fur	Fur	kùrù
NS	ES	Kenzi	kur(ti)
NS	CS	Mangbetu	kati
	CS	Aja	kuku
NS	Saharan	Zaghawa	kurru
NS	Berta	Undu	gufuŋ
NS	Kadugli	Katcha	-kuge (nu-)
NC		#PWN	-kwudi-
NC	Ubangian	Gbaya	gulu
NC	Kwa	Ewe	kòlí
NC	Bantu	*PB	-gudu 'leg'

Gregersen treats these as two distinct sets for leg and knee but they are probably to be put together and the more doubtful cognates discarded. Dimmendaal (1988:46) reconstructs Proto-Nilotic ***keli** for leg. A semantic change that also took place in Bantoid (Blench and Williamson, in prep). Cf. also the Proto-Cushitic ***gullb** / ***gwillb** for 'knee' (Ehret, 1987:24).

#**kulu** 'skin, hide' (C.:316, G.:21, Gr.:84, N.:93,)

NS	Songhay	Songhay	kúurú
NS	Saharan	Teda	koro-ta
NS	Kunama	Kunama	agala
NS	ES	Nuer	kul
NS	ES	Murle	kween
NC	Mande	Bozo	korō
NC	Atlantic	Gola	koro

Greenberg in adducing evidence for Kordofanian, quotes only Krongo. However, his form does not correspond to that in Reh (1985) which is not evidently cognate. His citations for Niger-Congo suggest that the second syllable was lost after the PAC stage, as only the **-ko-** syllable is preserved. Creissels (1981:316) adds further citations for Niger-Congo.

#**um** 'Navel, belly'

	Shabo	Shabo	j-ukuma (s-)	belly
	Kuliak	Tepes	gud	navel
	Komuz	Komo	kímì	belly
	Fur	Biltine	duu pl. kutu	belly
	ES	Murle	keŋ	belly
	CS	Yulu	kūum	navel
	CS	Mödö	kúmú	navel
	Kado	Katcha	kúllù	navel
	Kordofanian	Orig	kímì(s-)	belly
	PMC	*PWN	-kwuna-	navel

The Nilo-Saharan series is discussed in Stevenson (1991:365). One of the new series to include a possible Kuliak cognate. If Fleming (1995) is correct to connect this with liver in Shabo, as is suggested by the gloss for liver, 'cukuma', then Koman forms such as **chokom** also become part of the series. This is probably the same

series as Westermann's (W.:235) for 'belly' as many of his forms also have a nasal in C₂ position. Some Niger-Congo forms have a bilabial nasal, such as Diola e-kumfulot. Strangely enough, the other Koman lexemes giving Proto-Koman ***buma** more closely resemble the Niger-Congo root **#pu** (W.:258) although this is probably coincidence.

#-kan(d)i 'firewood' (D.:41, M.:II:175, Williamson, 1989b:253)

NS	Shabo	Shabo	konna	tree
NS	Kado	Krongo	káádi	firewood
NS	ES	Birgid	kan	tree
NS	ES	Surma	keen	trees
NS	ES	Pokot	kween	firewood
NS	CS	Ngambay	kír	firewood (?C)
NC	Mande	Kono-Vai	kon	tree
NC	PAC	#PWN	#-kuni	firewood
NC	BC	#PBC	#-kóni	firewood

The Kado form has /d/ in C₂ position throughout the group -assuming this form is cognate then a prenasalised dental must be reconstructed in this position. The gloss alternates between 'tree' and 'firewood' in both Nilo-Saharan and Niger-Congo. Williamson (1989b:253) observes that although this root is scattered through Niger-Congo as 'tree' it can mean 'firewood' or 'tree' within Benue-Congo.

#kur 'stone, hill' (D.:53, Gr.:87)

NS	ES	Nubian	kul, kur	stone
	ES	*PN	*kər	stone
	ES	Tama	kwura	stone
NS	Maba	Maban	kódó-k	stone
NS	CS	Fer	kòt	stone
	CS	Yulu	kán	stone
NS	Songhay	Songhay	guru	hill
NS	Saharan	Kanuri	kâu	stone
NC	Kordofanian	Ebang	k-ál (p-)	stone
NC	Mande	Malinke	kulu	rock
NC	BC	Nupe	ta-kū	stone
NC	Bantu	#CB	-gùe	stone
NC	Bantu	#CB	-gùdù	stone

Neither Westermann nor Mukarovsky reconstruct the -ku element for Niger-Congo although Westermann remarked on it. In Benue-Congo it frequently appears compounded with the more common -ta. Ta- appears in at least one NS language, Fur, which has 'taru' for boulder. Jagersen (1972:87) appears to be the first to have collected the (scattered) attestations. Notice that the semantic association stone and hill appears in Afro-Asiatic as well, e.g. Hausa **ɗutse**. Jagersen associates terms for 'testicle' with 'stone', a comparison also found in colloquial English.

#-kɔ 'four' (D.:43, G.:18, Gr.:83, M.:II:283 ff.)

	Fur	Fur	ɔɲal
East Sudanic	*PN		*(ɔ)ɲwan
PMC	*PWS		-nan-

There appears to be no trace of this root in Kordofanian. C₂ in NC is followed by a velar nasal

#**tum** 'to build' (G:136, W.:290)

NS	Songhay	Songhay	tyin [?]	
NS	Saharan	Kanuri	təm	
NS	Fur	Fur	tumu	
NS	Maba	Aiki	sim	construire
NC		#PWS	tù	
NC	Bantu	#PB	#-tunga	

Greenberg identified the Songhay form with a different NS root for build **#-gana**. This root acquired additional meanings such as 'push through' and 'sew' -perhaps connected either with sewing thatch or alternatively the construction of house-frames.

Congo-Kadugli

#-**kub-** 'bone' (D.:33, G.:97[?])

NS	ES	*PN	*kāw	
NS	CS	Lokai	kwa	
NS	CS	Kresh	kpəkpa	
NS	Kado	Katcha	kùbà	
NC	PVC	#PWN	-ku, kup, -kua	
NC	Bantu	#CB	*-kupa	

The reconstruction of bone in Nilotic is discussed in Dimmendaal (1988:33) who notes that an alternative Proto-Nilotic reconstruction was proposed as ***kyogo**. Bender (1992:47) reconstructs bone for his Central Sudanic 'Core' group as **#kpa**, though some of his examples, such as Lokai, above, are very close to Nilotic. Stevenson (1991:364) also discusses this root and gives more examples of cognates in Nilotic Saharan. Kordofanian forms such as kús/sús (Orig) are probably not cognate.

Westermann (1927:238) proposes three separate proto-forms as labial velars occur in root-initial position throughout all branches of Proto-Volta Congo simultaneously with the **#ku(bi)** forms. So far as

attestations in Mande, Atlantic or Kordofanian, opening up the outside possibility of an ancient loan. Greenberg gives a cognate list for Eastern Sudanic with a dental in C₂ position, an improbable sound-change. However, the weakening of C₂ in Nilotic languages raises the possibility of a compounding process developing the 'new' root-form.

#**mor-** 'fat, oil, grease' (D.:40, W.:257)

NS	ES	Murle	more	
NS	ES	*PN	*mō-r	
NS	ES	Proto-Daju	*mwi-	
NC	Kordofanian	Talodi	ŋ-aag	(?C)
NC	Kordofanian	Moro	ŋela	grease
NC	PMC	#PWS	-mì	
NC	BC	Aten	mos	fat

The analysis of this word is complicated by the fact that forms for mass nouns seem to turn up with m- affixes (see section 6). It seems certain that the Kordofanian forms are actually cognate. However, Kordofanian ŋ- classes for mass nouns seem to correspond to m- classes in other branches of Niger-Congo (Black and Black, 1971:11). The Moro form is thus more convincing as a possible cognate. Greenberg (1966:156) has another root for Proto-Mande-Congo, something like **#-kpa**, but the Kordofanian link is excluded as his comparisons are only with Kado languages.

#**Na** 'to bite'

Kado	Tulishi	adɔŋâ
CS	Ngambay	tô
Mande	Susu	dô
PAC	PWN	#dum-
Gur	Dagbani	dô
Bantu	#CB	#dum-

This is a very widespread NC root, more commonly with a bilabial nasal in final position.

#nyi 'tooth' (B:258, G.:23, S.:1981, W.:267)

NS	ES	Birgid	nildi
NS	Kadugli	#PKado	*-ini
NC	Kordofanian	*PR	*-piŋ
NC		#PWS	*-ni, *-nin-

Mimi 'nyain' (cited in Edgar, 1991:333) may be cognate, but the exact affiliation of Mimi is in doubt.

Niger-Congo with Central Sudanic

The most contentious hypothesis confronted here may be the direct links with Central Sudanic. Unfortunately, there seem to be relatively few isoglosses shared only between Niger-Congo and Central Sudanic.

#(m)ba(CV) 'female breast' (B:254, M.:II,25, W.:207-8)

NS	CS	Fer	kùmvà
NS	CS	Ma'di	bà
NS	CS	Mödö	mbà
NS	CS	PCS	#-mba
NC	PMC	#PWS	#-bi-

Found through most of Niger-Congo and throughout Central Sudanic. The restricted Nilo-Saharan distribution might be taken to show an early loan from Niger-Congo into Central Sudanic. Mukarovsky's citations show that there was a second syllable in the Niger-Congo root, perhaps with a lateral in C₂ position. Some forms, such as Lumbi **hu-bili/ma-** also hint at a nasal prefix, as in Central Sudanic.

pu 'ten'

CS	Yulu	kpúu
CS	Kresh	kpuu
PMC	#PWN	#-pi-, -pu-

vonson (1991:367) proposes a set of NS cognates to connect with **do** adàbàgá but I do not think either that his series forms a set, nor they cognate with this root.

V 'word, to say' (W.:283)

CS	Ngambay	tàr	word
Kordofanian	Moro	ata	to say
PAC	#PWS	tá-	sagen
Gur	'Atjúló' ¹¹	o-ta-re	word

A very satisfactory root as there are limited Central Sudanic forms. Probably just a coincidence.

'canoe'

CS	Bongo	yér
PAC	PWN	#-yat-
Bantu	CB	#-yátò

reconstruction is discussed by Williamson (1989c:119) in relation with the prehistory of the Niger-Delta. If, however, canoe reconstructed still further back then the implications for aquatic are striking. It is curious that there are so few attestations in Niger-Congo, despite the convincing nature of the forms.

APPENDIX 3. WIDESPREAD ROOTS THAT DO NOT CONTRIBUTE TO THE ESTABLISHMENT OF GENETIC RELATIONSHIP

The following words have been suggested by various authors as evidence of genetic affiliation. They are, however, too widespread in Central African languages to produce any useful results and correspond to Westermann's 'Wanderwörter'.

#isi 'fire'

NS	ES	Meidob	ussi
NS	Kado	Miri	issi
NS	CS	Miza	a(t)si
NS	CS	Shemyar	dufu-n
NC	Kordofanian	Moro	isia
NC	Dakoid	Nnakenyare	yísi
NC	Tivoid	Tiv	wufu
AA	Semitic	Akkadian	ifaat-
AA	Chadic	Karekare	?èsi

Unlike 'pig' and 'dog' it is surprising to find 'fire' in the category of wandering words, as it should be a very basic root. Nonetheless, its Central African distribution leaves no doubt that it is an areal loan, although it is difficult to establish the source language. If the Akkadian form is genuinely related, then it is tempting to assume this an old AA root loaned into NS and thence into eastern NC. Discussed in Bender (1975, 1991c:5). Bender (1992:43) reconstructs Proto-Central Sudanic **#co**, but as an areal loan, reconstruction is probably not a meaningful exercise.

#-kutu 'pig'. (Wild types)

NS	Koman	Anej	kuturu	
NS	ES	Nyimang	kudur	
NS	Maba	Aiki	girwà	wart-hog (?C)
NS	Saharan	Kanuri	godu	
NS	Kado	Kamdang	b-oduruk pl. k-	
NC	Kordofanian	Orig	aduruk	
NC	Bantu	#CB	kàdirú	
AA	Semitic	Sudan Arabic	#-gùdú	wild pig
AA	Chadic	Hausa	kadruuk	
			gàduu	

This root appears both in NS, NC and Chadic and can apply both to the warthog and the bush-pig (*Potamochoerus porcus*). Cited by Rogersen (1972:86) who also mentions Greenberg's suggestion that the Saharan form was loaned into *PB. Schadeberg and Elias (1979:84) mention that this root has been loaned into Sudanese Arabic to give kadruuk.

#-dog

Fur	Fur	asà
ES	Proto-Daju	*iise
CS	Baka	isi
CS	Lugbara	atsí
CS	Lendu	kazz
Koman	Anej	kas
Maba	Masalit	wasi
Kado	Katcha	is(s)i
Bantoid	Ndoro	síe
BC	E. Ogbia	isið
BC	Nupe	efi

This is a fascinating root as it is extremely widespread in Central Africa yet does not form a convincing pattern. In Central Sudanic, for example, it is attested in almost every language (Bender, 1992:40,48). Bender separates the roots with initial b, but it is likely that the two may go together. Afro-Asiatic forms such as Sudanic **wajja** and Beja

yas presumably represent independent weakenings. Although originally cited by Greenberg (1966:120), more complete evidence was marshalled by Bender (1981:258) with attestations in Fur, Sudanic, Kordofanian and possibly Ari [Omotic]. It is also found in Benue-Congo (Blench, in prep) but there is no evidence for it in other parts of West Africa. The domestic dog is not native to Africa (Epstein, 1971) and these wandering words may reflect the diffusion of the dog itself.

APPENDIX 4. POSSIBLE ISOGLOSSES WITH IDEOPHONIC DERIVATIONS

Some words do seem to constitute good isoglosses for NGS but the presence of apparently good cognates outside these two families suggests either that they are very ancient, or more likely, that they are derived via sound symbolism.

#kpa 'to cough' (Gr.:81, W.:245)

NS	Fur	Fur	kulugola
NS	CS	Moru	äkpö
NS	CS	Mödö	ikähì
NC		#PWS	#kual-, kuan-
NC	BC	Nupe	kpa

Central Sudanic forms generally have /kp/ (Bender, 1992:47) and it is likely that Westermann's reconstruction should be amended to include a labial-velar. Like **#pur**, 'to fly', sound-symbolism may produce comparable forms in otherwise unrelated phyla. For example, Proto-Australian for cough is ***kuntul** and Proto-Eastern Highlands [Papuan] ***kutu** (Foley, 1986:275). Even English, /kəf/ could be added without stretching the set too far.

#pur 'to fly, jump' (Gr.:83,D.:42, W.:275)

NS	Songhay	Songhay	firi	
NS	Saharan	Kanuri	fàr	'to jump, fly'
NS	Maba	Mesalit	fir	
NS	Berta	Berta	hə'rəŋ	
NS	ES	Nubian	fire	'to flutter'
NS	ES	*PN	*pär	
NC	Kordofanian	Moro	abəro	to fly
NC		*PWS	*pi, pil-	'to fly, flutter'
NC	Mande	Samo	pere	

Notice that the meanings of 'fly' and 'jump' are regularly intertwined in both NS and NC. Ehret (1987:26) notes a striking set of cognates in Cushitic;

		*par-/ *pir-/ *pur-	
	Beja	biir	fly
	Awngi	pərr-	jump
to-East-Cushitic		*bar(ar)	fly
th Cushitic	Ma'a	-puru	fly

Noted above, since the English 'fly' could also in principle be seen as a cognate, this word may develop through some ideophonic process. Ehret noted a similar form as a world gloss, derived ideophonically, though he spreads the net over a wider set of glosses than is included here. However, compare forms such as Tibetan **-phir**, to fly.

APPENDIX 5. SUGGESTED FORMS REJECTED

#black ' (Gr.:80,W.:206,G.:15)

Songhay	Songhay	bibi
PMC	*PWS	-bi-

was suggested as a Kongo Saharan isogloss by Gregersen (1980) but his evidence for Nilo-Saharan is weak. The Kanuri

citation appears to be wrong and the Moru form somewhat remote. It is therefore suggested that the Songhay form is simply a loan from a Mande language such as Bozo.