

# COMPARATIVE CHADIC : PHONOLOGY AND LEXICON

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THE AREA south of the Sahara, stretching across Northern Nigeria, the Northern Cameroons, and into the Chad Republic, is a region of unusual linguistic diversity.<sup>1</sup> In addition to Kanuri, which belongs to the Nilo-Saharan family, and Fulani, the easternmost extension of the West Atlantic group of languages, this region contains an extremely large number of languages whose linguistic classification has not been settled. One of these, Hausa, a major world language spoken as a mother tongue or a second language by perhaps over twenty million people, has been the subject of study for the past 100 years.<sup>2</sup> Most of the others, all of which have considerably under 150,000 speakers, were known until recently only by means of short word lists collected by field workers whose training was below modern standards.

In 1936, Lukas [18] attempted to bring order out of chaos by tentatively classifying some of the languages of this region.<sup>3</sup> He set up two distinct groups, a 'Chado-Hamitic' group to which he assigned Hausa, Bolewa, Kotoko, Mubi, and other languages generally characterized by the presence of grammatical gender, and a 'Mandara' group comprised of Wandala (Mandara), Margi, and other languages of the Nigeria-Cameroon border area, languages not having grammatical gender. Some languages were incorrectly classified because of the inordinate importance ascribed to certain typological features (notably grammatical gender), but on the whole, Lukas presented a reliable, conservative classification based on considerations of phonology and vocabulary as well as of grammar.

Writing in 1952 for the *Handbook of African Languages* [29], Lukas<sup>4</sup> reasserted the basic division between the 'Chado-Hamitic' and 'Mandara' languages, although he greatly expanded the list of languages under each group. He noted similarities between the two groups, but contended that these were not adequate to justify combining them into a single family.<sup>5</sup>

In 1950, Greenberg [3] published a paper in which he asserted that all of these

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<sup>1</sup> This is a revised and greatly expanded version of a paper presented by the senior author to the Linguistic Society of America in New York, December 1964. The work was partially supported by a grant from the African Studies Center, University of California, Los Angeles, and by a National Defense Foreign Language Fellowship. We wish to thank Professors William Welmers, Paul Schachter, and Johannes Lukas for their valuable comments and criticisms. They do not necessarily endorse all the opinions expressed in this paper.

<sup>2</sup> Father J. F. Schön's publications on the Hausa language date from 1842. For a brief historical outline of Hausa studies, see Westermann's introduction to Bargery's dictionary [57].

<sup>3</sup> The classification presented ten years earlier by Delafosse [2] was admittedly a geographical listing: 'Faute de pouvoir, dans l'état actuel de la science, adopter un ordre généalogique solide, je me suis arrêté à un ordre approximativement géographique . . .' (p. 477).

<sup>4</sup> Sections IX and X on Chado-Hamitic and Chadic (i.e., 'Mandara') were prepared by Lukas. This was not clearly indicated in the publication.

<sup>5</sup> Reacting against earlier large-scale speculative classifications (such as Meinhof's Hamitic family), Lukas as well as Westermann and Bryan required that two languages (or groups of languages) be considered distinct until they had been proven to be related. While Greenberg fully agrees with the desire to avoid arbitrary and irresponsible classifications, he nevertheless has rejected this requirement as scientifically invalid. He maintains that the historical-comparative linguist may not simply decide whether data are adequate to substantiate the hypothesis that certain languages are related. Rather, the linguist must weigh all the evidence and choose between two competing hypotheses—that A is related to B or that A is *not* related to B. This point of view is implicit throughout our study.

languages, as well as a number of Jos Plateau languages,<sup>1</sup> belonged to a single linguistic unit which he termed the Chad family. In addition, he claimed that the Chad family as a whole (and not just Hausa as suggested by previous writers) was ultimately related to the 'Hamito-Semitic' languages (Semitic, Berber, Cushitic, and Ancient Egyptian) and thereby formed a distinct branch of what he now calls the Afro-Asiatic family. Although he was offering two distinct (but not unrelated) hypotheses—one concerning the internal composition of the Chad family, the other concerning the external relationship of this group as a whole to other groups—Greenberg did not present separate supporting evidence for each of these hypotheses. He did not provide lexical items and grammatical similarities which were common to Chadic languages but not found elsewhere in Afro-Asiatic. His proof of the unity of the Chad family was thereby rendered weaker than it need have been.

The aim of this paper is to demonstrate conclusively that the Chad family as postulated by Greenberg does indeed constitute a valid linguistic unit. The proof consists of the establishment of regular phonological correspondences between the two major divisions within Chad and of the subsequent reconstruction of nearly 150 Proto-Chadic lexical items. This paper focuses entirely on problems within the Chad family and does not concern itself with the question of the further relationship of Chad to other language groups. However, by providing a detailed exposition of the Chad family, this study should contribute toward the ultimate verification of the anthropologically far-reaching and linguistically exciting Afro-Asiatic hypothesis.

#### GROUPS WITHIN CHADIC

In establishing a single Chad family, Greenberg discarded the dichotomy between Lukas's 'Chado-Hamitic' and 'Mandara' groups; instead, he tentatively reclassified these languages into nine subgroups.<sup>2</sup> His Group 1 is comprised of Hausa, the Plateau languages, and a large number of other 'Chado-Hamitic' languages. His Group 3 is comprised of Margi, Tera, and other 'Mandara' languages. These two large groups contrast noticeably in size with the other subgroups, some of which have as few as one member.<sup>3</sup> Not all of the smaller groups warrant separate status. Although further research is necessary before the exact relationship of these to Groups 1 and 3 can be ascertained, it appears that Lukas's dichotomous framework will form the basis for a proper subgrouping of the Chad family. Our preliminary work on languages outside the two major groups indicates that the Group 6 languages (Wandala and Gamergu) belong with Group 3. For the combined Groups 3 and 6, we suggest the name 'Biu-Mandara'. Group 9 (Mubi, Sokoro, etc.) appears to be coordinate with Group 1. For this new group composed of Groups 1 and 9, we suggest the name 'Plateau-Sahel'.<sup>4</sup>

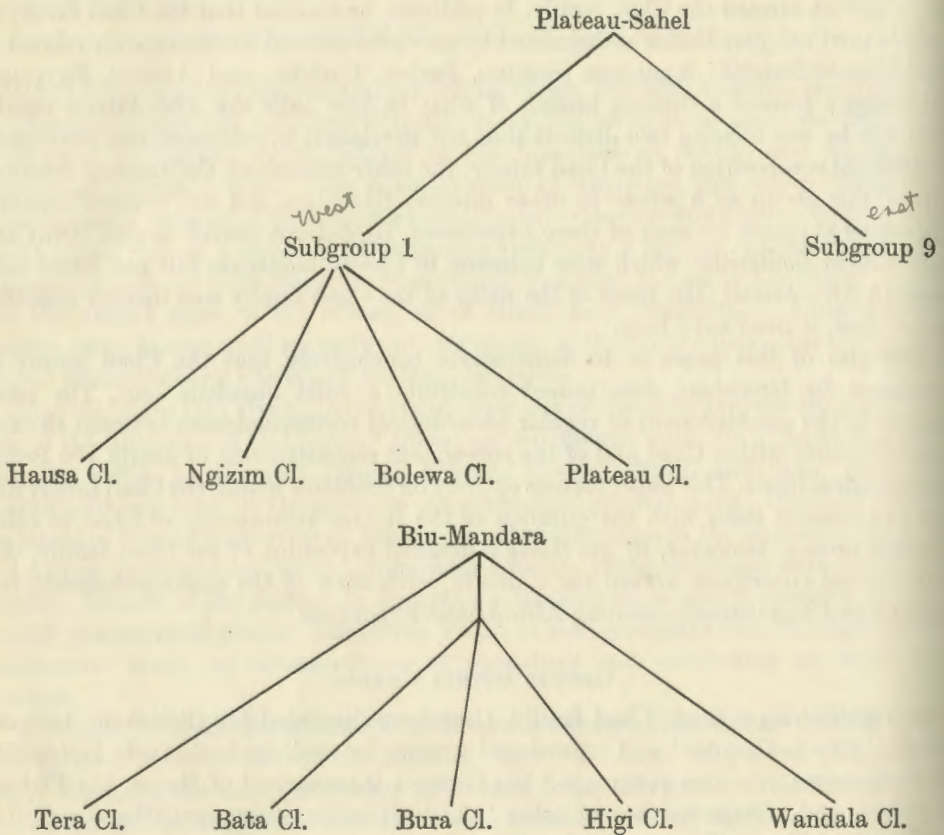
<sup>1</sup> These languages were incorrectly classified in the *Handbook* under the Non-Class Languages in spite of the fact that the relationship of these languages to Hausa had been recognized and convincingly demonstrated forty years earlier by Migeod [24] and Foulkes [37].

<sup>2</sup> For a full list of Chadic languages and their assignment to his subgroups, see Greenberg [8], p. 46.

<sup>3</sup> Groups 1 and 3 have forty and thirty languages, respectively, whereas Groups 5 and 6, for example, have only one and two languages, respectively.

<sup>4</sup> Following Greenberg's practice, we have selected designations of a geographical nature. The Plateau-Sahel group extends from the Jos Plateau to the southern edge of the Sahara, while most of the Biu-Mandara languages are in the vicinity of the Biu Plateau and the Mandara mountains.

FIG. I



Within each of these groups, closely related languages form easily recognizable clusters. The relationship between the languages of a cluster is sufficiently close to allow a citation from any one language to be taken as representative of the cluster as a whole. In this paper, most phonological problems are discussed at the level of the cluster.

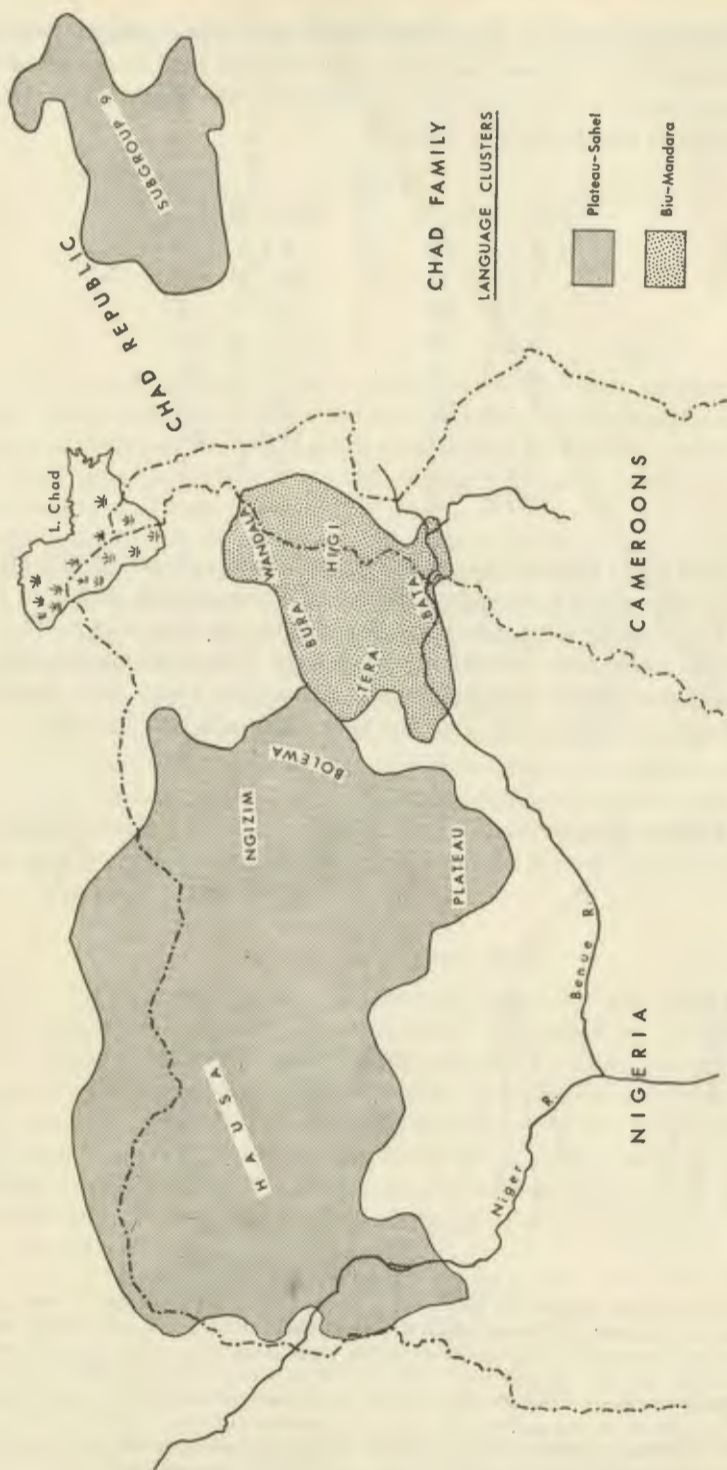
Between the cluster and the group, there should be intermediate nodes indicating further subgrouping relationships; for our purposes, however, we have proceeded *as if* the clusters were more or less coordinate. The tree diagrams (Fig. I) represent the structure of the two groups.<sup>1</sup>

The approximate geographical distribution of these language clusters can be seen from the accompanying map (after Westermann and Bryan).

#### PROTO-CHADIC CONSONANTS

A careful comparison of lexical items from the Plateau-Sahel and Biu-Mandara languages uncovers the existence of regular phonological correspondences between the

<sup>1</sup> We have not further broken down Subgroup 9. For a list of the languages belonging to each cluster, see Table II preceding our Proto-Chadic comparative word list.



CHAD FAMILY  
LANGUAGE CLUSTERS

- Plateau-Sahel
- Biu-Mandara

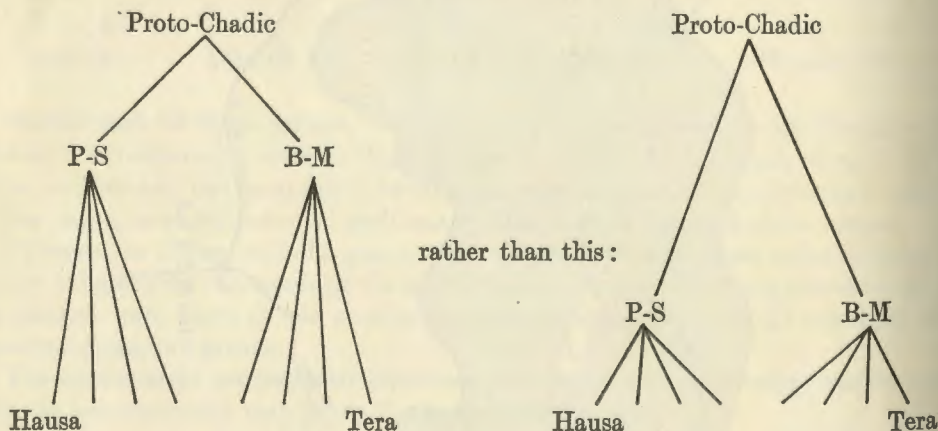
consonants of the two major groups. Table I shows each correspondence and the number of its occurrences in our Proto-Chadic comparative word list.<sup>1</sup> It should be emphasized that the large number of consonants attested and the many supporting examples effectively rule out the question of chance.

TABLE I.<sup>2</sup>

P-S	B-M	P-S	B-M
f/p : p	10	s : s	11
t : t	17	s : tl	9
k : k	25	z : z	6
b : v	9	m : m	25
d : d	13	n : n	12
g : g	15	w : w	8
ɓ : ɓ	7	r : r	30
d' : d'	9	l : l	6
f : f	4		

Since almost all of these correspondences are between phonologically identical units, the sound changes which have caused individual Plateau-Sahel languages (e.g., Hausa) to differ so considerably from individual Biu-Mandara languages (e.g., Tera) must have occurred within rather than between the two groups. This would suggest that differentiation within Plateau-Sahel and Biu-Mandara probably began very shortly after the major split, so that a family tree diagram (Fig. II) would look like this:

FIG. II



<sup>1</sup> These are minimum figures. We have not included the items of our 'second level confidence' word list. We have not counted obstruents where we were unable to ascertain the voicing feature nor nasals where the point of articulation was not determinable. Since Hausa (and other Plateau-Sahel languages) do not have both /f/ and /p/, we have combined *f : p* and *p : p* together as opposed to *f : f*.

<sup>2</sup> Throughout this paper, the following symbols have been used: *ɓ*, *ɗ*, *ʝ*, *ʎ*, and *ʂ* are glottalized obstruents; *dl* and *tl* are voiced and voiceless lateral fricatives (IPA [l̥] and [l̥]); *gh* is a velar fricative (IPA [χ]); *R* is a rolled *r* which in Hausa contrasts with a flap *r*. Long vowels are marked with a macron; vowel length is indicated for Hausa and Tera forms only. Tone is nowhere indicated.

On the basis of the above correspondences, we have reconstructed these Proto-Chadic consonants:

p	t	k
b	d	g
ɓ	ɗ	
f	s	
	z	
m	n	
w	r	
	l	

The above does not purport to be a complete Proto-Chadic consonant chart; it includes only those consonants which we can reconstruct with confidence. However, the chart is quite rich, and we would guess that, except for lacking a velar fricative, a glottalized velar, and perhaps a series of palatals,<sup>1</sup> it does approximate the true consonantal inventory of Proto-Chadic.

Following Greenberg [4], we have set up \**p* and \**f* as distinct protophonemes. Since the *p/f* contrast is such an unstable one throughout the Chadic area, there were many cases where it was not possible to determine whether the cognate forms contained reflexes of one or the other. However, there were enough clearcut cases to establish these two as distinct Proto-Chadic phonemes.

The glottalized phonemes \**ɓ* and \**ɗ* are well established not just on the basis of the supporting examples but also because of the remarkable absence of counterexamples.<sup>2</sup> We believe that Proto-Chadic probably also had some kind of glottalized velar (perhaps \**w*) due to the fact that many present-day Chadic languages do have at least one other glottalized consonant in addition to *ɓ* and *ɗ*. Velar fricatives might also have existed in the protolanguage, but as with the glottalized velar, we are not able to establish them on the basis of regular correspondences.

#### PRENASALIZED CONSONANTS

Missing from our inventory of Proto-Chadic consonants is a set of prenasalized (or nasal onset) consonants—unit phonemes commonly designated by the digraphs *m̃b*, *ñd*, *ŋ̃g*. Their existence in Proto-Chadic was postulated by Greenberg [4] to explain certain anomalies in sound correspondences between Jos Plateau languages and Hausa and Bolewa cluster languages. Cognate forms containing voiced consonants in non-Plateau languages usually contain voiceless consonants in Plateau languages. But there are a number of cases where the Plateau languages also have voiced reflexes. Greenberg postulated that these latter consonants were reflexes of a protoconsonant which was prenasalized, that is,

Plateau *p* = non-Plateau *b* < \**b*

Plateau *b* = non-Plateau *b* < \**mb*

<sup>1</sup> The reason for not considering palatals is given below in the discussion of common sound changes in Chadic.

<sup>2</sup> What appear to be counterexamples invariably are forms recorded by earlier linguists with inadequate training who failed to distinguish consistently between voiced and glottalized consonants.

Equally important questions directly concerning prenasals arise in other groups of Chadic languages. Not the least of these is the question of the origin of the prenasal stops which at present are distributed widely in both the Plateau-Sahel and the Biu-Mandara groups of the Chad family.<sup>1</sup>

A possible answer is that they are reflexes of the Proto-Chadic prenasals postulated by Greenberg. If this were the case, we would expect to find the regularity and frequency of correspondences between Plateau-Sahel and Biu-Mandara prenasal consonants which we find for the other phonemes investigated. Instead, we have been able to identify only a few cognates containing a prenasal element and these fail to display a consistent pattern. In contrast to the three examples where both Plateau-Sahel and Biu-Mandara forms contain prenasals, there are two counterexamples where this is not true for Biu-Mandara.<sup>2</sup>

	PLATEAU-SAHEL	BIU-MANDARA
1. dove	Sura <i>mbul</i> , Bolewa <i>mbole</i>	Tera <i>mbōla</i>
2. to refuse	Gerka <i>nga</i>	Margi <i>nka</i>
3. spear	Ngizim <i>ngas</i> (cf. Angas <i>gaši</i> , Hausa <i>māši</i> )	Fali/Kiria <i>ngwassa</i>
1. hawk	Sura <i>ɲkālɪŋ</i>	Tera <i>kalārī</i>
2. ram	Sura <i>ɲgam</i>	Tera <i>gam</i>

A closer look at the above examples reveals that they are not in fact true examples of prenasalized consonants, for it is doubtful whether the letters NC in the Plateau-Sahel forms represent prenasal stop phonemes. The three Sura forms are reliably reported by Jungtraithmayr to contain syllabic nasal plus consonant, not prenasalized phonemes which this language also has. The Bolewa, Gerka, and Ngizim words were taken from writers<sup>3</sup> who generally failed to recognize prenasal stops, transcribing them simply as voiced stops. Since the initial nasal component was not omitted in the above cases, what they heard and duly transcribed must have been syllabic nasals. In short, we are not able to cite a single Plateau-Sahel form containing true prenasalized phonemes.

Even when we examine closely related clusters within a major group, we find the same irregularity and unpredictability in trying to establish these correspondences. For example, although we find numerous cognates in the Tera and Bura clusters with these consonants, we cannot establish a general rule regarding the correspondence. In addition to examples of NC : NC, there are equally common examples of NC : C and C : NC.

<sup>1</sup> We have dependable reports of their existence in Sura (Jungtraithmayr), Margi (Hoffmann), and Tera (Newman), so that we can extrapolate therefrom to other members of the same clusters. These consonants are reliably reported *not* to exist in Hausa or in Jegu (Subgroup 9).

<sup>2</sup> There are a number of examples where the Biu-Mandara form has a prenasal and the Hausa form does not, but since Hausa does not have these phonemes, such cases cannot qualify as counterevidence.

<sup>3</sup> Benton [33], Fitzpatrick [36], and Meek [52].

	CORRESPONDENCE	TERA CLUSTER	BURA CLUSTER
to burn/make fire	C : NC	<i>va</i> (Tera)	<i>mba</i> (Bura)
crocodile		<i>ʃiray</i> (T)	<i>ngələm</i> (Bu)
five		<i>tuf</i> (Hona)	<i>mtəfə</i> (Margi)
four		<i>vad</i> (T)	<i>nfwar</i> (Bu)
to untie		<i>pərə</i> (T)	<i>mpəl</i> (M)
sheep	NC : C	<i>ndomox</i> (Jara)	<i>tima</i> (Bu)
to pour away		<i>mbədə</i> (T)	<i>pe</i> (M)
to divide	NC : NC	<i>nʃoxə</i> (T)	<i>ntəkə</i> (M)
a thorn		<i>ndēkī</i> (T)	<i>mtəxərə</i> (Bu)
a wound		<i>mbir</i> (T)	<i>mbəlku</i> (Bu)

A possible explanation of the above would be to assume that at an earlier period all of the examples had a prenasal element which was subsequently lost, sometimes in Tera and sometimes in Bura.<sup>1</sup> In some cases, the former presence of a nasal element is evident, as in the Tera word for 'four' *vad*. The initial /v/ which occurs instead of the expected /f/ can be accounted for by assuming that there had been assimilatory voicing to a preceding nasal. Unlike Bura and Margi, the Tera inventory does not include /*m̃p*/, /*ñt*/, etc., but only /*m̃b*/, /*ñd*/, etc. If a nasal element were lost from a Tera prenasal, the resulting consonant would invariably be voiced. Therefore, the derivation of Tera *vad* would be as follows: *vad* < \**nvad* < \**n-fad* < \**fad*. For the same reasons we would expect the Tera word for 'to untie' to be \**bərə* rather than *pərə*, cf. Margi *mpəl*. In this case, we can only guess that either the nasal component was a Margi innovation rather than a retention, or that devoicing in Tera was a later change.

If we assume that the above forms all developed from Proto-Tera-Bura forms containing initial nasal elements, and we note that retention or loss of these elements is unpredictable, then we can only conclude that, in the earlier period, they were not simply components of complex unit phonemes. What seems true of Biu-Mandara seems true of the Chad family as a whole: Proto-Chadic probably did *not* have a set of prenasalized unit phonemes subject to regular sound laws. That it did have sequences of initial nasal plus consonant seems undeniable. However, we postulate that this nasal was an independent phoneme and not just a component of a phonetically complex unit.<sup>2</sup> Some Chadic languages have since lost these initial nasals entirely. In others, the nasals have fused with the following consonant to form prenasalized phonemes.<sup>3</sup>

#### SOUND CHANGES BETWEEN PLATEAU-SAHEL AND BIU-MANDARA

Only a few sound changes can be described as having occurred at the level of Plateau-Sahel and Biu-Mandara. These are (1) \**b* > Biu-Mandara *v* and (2) the split in Biu-Mandara of \**s* into *s* and *ʃ*. The first shift no doubt began as a phonetic alternation, later becoming phonemic due partly to the introduction of Kanuri loanwords

<sup>1</sup> This is of course the same type of situation which Greenberg was attempting to account for in the Plateau languages.

<sup>2</sup> The existence of syllabic nasals in Proto-Chadic may have been due to the influence exerted by neighbouring Niger-Congo languages.

<sup>3</sup> For another example of independent phonemes fusing to form unit phonemes, see discussion below on labio-alveolar consonants in the Bura cluster.



containing /b/. This explanation is based on the fact that, while many Biu-Mandara languages (at least Bura and Tera cluster languages) now have a phonemic distinction between /b/ and /v/, cognate forms never contain /b/. Forms with /b/, however, quite often can be identified as straightforward Kanuri loans:

bran	Tera <i>bīni</i>	Bura <i>bina</i>	Kanuri <i>bina</i>
to hunt	Tera <i>bara</i>	Bura <i>bara</i>	Kanuri <i>bara</i>
mat		Bura <i>buči</i>	Kanuri <i>bəfi</i>
razor	Tera <i>bele</i>		Kanuri <i>beli</i>

Although we cannot as yet ascertain the conditioning factor which caused the split of \*s into s and *l*,<sup>1</sup> it seems preferable to consider it as a Biu-Mandara innovation. A likely guess is that the determining environment was a following front vowel, so that the historical process might have been \*si > [tli], phonemic contrast arising as a result of a subsequent vowel shift.<sup>2</sup> Treating s and *l* as reflexes of a single protophoneme \*s has the further advantage of being consistent with data from other Afro-Asiatic languages.

#### SOUND CHANGES WITHIN PLATEAU-SAHEL

The best known Chadic sound shifts are those concerning syllable final consonants in Hausa, described by Klingenheben [13] and Westermann [57]. What is now referred to as Klingenheben's law is the historical change of syllable final labials and velars to /u/ and of alveolars to /ɛ/, e.g., *zauna* 'to sit' < \**zamna*, *ɓaunā* 'buffalo' < \**ɓaknā*, *farkē* 'trader' < \**fakē*. Data compiled in this paper have disclosed a less regular but nonetheless recurring change from syllable final /r/ > /y/, for example:

fish	Hausa <i>kiifī</i>	cf. Gudu <i>hirfu</i>
oil	Hausa <i>mai</i>	cf. Sura <i>mor</i>
root	Hausa <i>saiwā</i>	cf. Gudu <i>ilerwa</i>

Moreover, we have also discovered a number of cases where /r/ has weakened to /y/ in intervocalic position as well, for example:

bark (of tree)	Hausa <i>ɓāwō</i>	Hona <i>bara</i>
foot	Hausa <i>sāwū</i>	Tera <i>sārə</i>
to fry	Hausa <i>sōyā</i>	cf. Angas <i>sur</i>
neck	Hausa <i>wuya</i>	cf. Ngizim <i>wura</i>

Sound shifts in the Plateau cluster have been described by Greenberg [4] and are briefly as follows: (1) There is general devoicing in initial and final positions, resulting in a merger of Proto-Chadic C<sub>vd</sub> with C<sub>v1</sub>.<sup>3</sup> Ankwe alone of these languages has retained the original voiced/voiceless contrast, the former voiceless series now being glottalized, e.g., \*b > /p/, \*p > /p'/.

(2) Final /-n/ is commonly but not regularly derived from

<sup>1</sup> The voiced lateral fricative /dl/ also occurs in many Biu-Mandara languages. Historically, its origin is far from clear. We are tentatively treating it as a further split from /tl/.

<sup>2</sup> In the Tera language, /tl/ occurs before all six vowels while /s/ is not found before front vowels, except in recent loanwords. What appear to be examples of /s/ + /i/ must be interpreted morphophonemically as /s/ + /ə/ for reasons internal to the structure of Tera phonology.

<sup>3</sup> Exceptions to the devoicing rule were discussed above in the section on prenasalized consonants.

\*l. We have further discovered that Plateau /-n/ also corresponds frequently to \*r, for example:

big	Montol <i>kun</i>	cf. Bolewa <i>garan</i>
to give	Angas <i>pun</i>	cf. Ngizim <i>bar</i>
hawk	Sura <i>ɲkəlɪŋ</i>	cf. Tera <i>kəlārī</i>

## SOUND CHANGES WITHIN BIU-MANDARA

In the Bura cluster, there has been general devoicing of obstruents. This has also occurred independently in the Hona and Ga'anda languages of the Tera cluster.

	BURA CL.	TERA CL.	BATA/HIGI CL.
to eat	<i>səma</i> (Bura)	<i>simi</i> (Ga'anda), <i>zəmə</i> (Tera)	<i>zim</i> (Gudu)
horse	<i>taku</i> (Bu)	<i>dox</i> (T)	<i>duxu</i> (Gu)
slave	<i>mafa</i> (Margi)	<i>mafate</i> (Ga), <i>māva</i> (T)	<i>mava</i> (Higi)
ten	<i>kum</i> (M)	<i>kum</i> (Hona), <i>gwom</i> (T)	<i>gum</i> (Fali/Kiria)

Unlike Hona and Ga'anda, in which there has been complete merger of the voiced/voiceless contrast, voiced consonants do presently exist in the Bura languages, though very seldom in reflexes of Proto-Chadic forms. These voiced consonants (which occur much less frequently than their voiceless counterparts) are quite often found in Kanuri loanwords, cf. the following:

bed made of clay	Margi <i>dəgəl</i>	Kanuri <i>dəgalli</i>
bran	Bura <i>bina</i>	Kanuri <i>bina</i>
old cloth	Margi <i>dina</i>	Kanuri <i>dina</i>
truth	Bura <i>ɟire</i>	Kanuri <i>ɟire</i>

It is not unlikely that the voiced/voiceless contrast was lost entirely at some earlier period in the Bura cluster, only to reappear later from a combination of such factors as Kanuri influence and internal sound change probably connected with the loss of prenasal elements.

Two other regular changes in the Bura cluster are \*r > /l/ and \*n > /r/. These have also taken place in Wandala; in this language, however, the first change is limited to syllable final position.

*r > l:	BURA	WANDALA	TERA	BATA/HIGI
to dig	<i>la</i> (Margi)		<i>ra</i> (Tera)	
fish	<i>kilfə</i> (Bura)	<i>kəlfe</i>	<i>yurvu</i> (T)	<i>xirfu</i> (Gudu)
leg	<i>sil</i> (Bu)	<i>sira</i>	<i>sārə</i> (T)	<i>sirra</i> (Higi)
moon		<i>tere</i>	<i>ndəra</i> (Jara)	<i>tire</i> (Hi)
oil	<i>mal</i> (M)		<i>mar</i> (T)	<i>mar</i> (Gu)
root		<i>šallwa</i>	<i>dlar</i> (T)	<i>tlerwa</i> (Gu)
stone	<i>pela</i> (Bu)		<i>fere</i> (Hona)	<i>pire</i> (Hi)
*n > r:				
nose	<i>mčir</i> (M)	<i>əktare</i>		<i>čin</i> (Gu)
tooth	<i>tilir</i> (Bu)	<i>tlare</i>	<i>dlin</i> (T)	<i>tline</i> (Hi)
three	<i>makər</i> (M)		<i>maxan</i> (Ho)	<i>makine</i> (Hi)

An unusual feature of the Bura cluster is the presence of simultaneously articulated labio-alveolar consonants such as / $\widehat{p}t$ /, / $\widehat{b}d$ /, etc. Hoffmann [41] and Ladefoged [16] have both asserted that, phonetically, these sounds are co-articulated and that, phonemically, they fully qualify as unit phonemes. From a historical point of view, however, they can be analysed as having resulted from the loss of a vowel separating two consonants, i.e.,  $\widehat{CCV} < *CVCV$ . The hypothesis that these labio-alveolar consonants developed from a process of syncope is supported both by internal evidence and comparative data.

Turning to Margi (the best described language of the Bura cluster), we note that distributionally the labio-alveolar consonants are limited almost entirely to initial position.<sup>1</sup> Furthermore, the length of words containing these complex consonants tends on the average to be shorter than that of the vocabulary as a whole. Many of them are monosyllabic, having resulted from the contraction of disyllabic words—words having a pattern more generally favoured in Chadic languages.

Comparative evidence supporting our hypothesis is not abundant, but it is extremely convincing.

	BURA	TERA/BATA
children	$\widehat{b}z\text{ər}$ (Margi)	<i>basonka</i> (Tera)
to forge	$\widehat{b}d\text{l}\text{ə}$ (M)	<i>b\text{ə}d\text{l}\text{ə}</i> (T)
to kill (many)	$\widehat{b}d\text{l}\text{ə-na}$ (M)	<i>b\text{ə}t\text{l}\text{ə}</i> (Pidlimdi)
monkey	$\widehat{p}\text{č}\text{u}$ (M)	<i>f\text{ič}\text{e}</i> (Ga'anda)
sun/day	$\widehat{p}\text{č}\text{i}$ (Bura)	<i>fot\text{ə}</i> (Gudu)
chief	$\widehat{p}\text{t}\text{al}$ (M)	<i>kutira</i> (Ga)
grass	$\widehat{p}\text{s}\text{ar}$ (M), cf. <i>kusar</i> (Bu)	<i>wuz\text{ən}</i> (T)

The last two examples demonstrate, most interestingly, that these co-articulated consonants resulted not only from a sequence of labial plus alveolar, but also from a sequence of velar plus alveolar, i.e., in Jakobsonian terminology [15], from a sequence of any grave plus any acute consonant.

In the Tera cluster, the following conditioned sound changes have taken place:  $*k > /y/$  in the environment of front vowels, and  $*k > /x/$  in final position.

$*k > y$ :	TERA	OTHER CHADIC
fish	<i>yirvi</i> (Pidlimdi)	<i>kilf\text{ə}</i> (Bura)
head	<i>yin</i> (Tera)	<i>k\text{ər}</i> (Margi)
$*k > x$ :		
antelope	<i>gomox</i> (T)	<i>gwamk\text{ī}</i> (Hausa)
horse	<i>dox</i> (T)	<i>d\text{ō}k\text{ī}</i> (H)
sheep	<i>ndomox</i> (Jara)	<i>tum\text{ā}k\text{ī}</i> (H)

#### COMMON CHADIC PHONOLOGICAL FEATURES

For some phonological features characteristic of the entire Chad family, it is sometimes impossible to say whether we are describing a diachronic change or a synchronic state. Four features in particular deserve to be noted: (1) palatalization; (2) interchange

<sup>1</sup> This excludes reduplication, of course.

of /w/ and /y/; (3) neutralization of prosodic contrasts in syllable final position; and (4) /d/ > /r/ in syllable final position.

(1) Palatalization of consonants before front vowels is such a common phenomenon throughout the world (and in Chadic languages in particular) that we have made no attempt to distinguish /š/ from /s/, /č/ from /t/, etc. Proper phonemic analyses of the languages studied here will undoubtedly show that, for many languages, these palatals are allophones of corresponding alveolars and thus do not deserve separate treatment. But even where they are phonemically distinct, it may be impossible to isolate the change historically to a particular group at a particular time, since the ease with which palatalization occurs always leaves open the possibility of independent parallel change. Therefore, in this study, we have not attempted to distinguish more than three points of articulation.<sup>1</sup>

(2) A special case of the above is the equivalence of /y/ before front vowels and /w/ before back vowels. This can be seen, for example, in the Hausa doublet *wuni/yini* 'to spend the day' and in the cognate forms for 'dog' in closely related Hona and Ga'anda, *wude* and *yida*, respectively. Viewed as a directional process, /y/ > /w/ appears to be much less common than /w/ > /y/. Parsons [27] has described /y/ > /w/ in Hausa as an 'obsolete phonetic process' (p. 263, fn. 1), still evident in archaic forms such as *sawō* 'to buy and bring' < *sayā* 'to buy'; (cf. this old form with the now more common *sayō* without the consonant alternation). The /w/ > /y/ shift, on the other hand, still functions actively in Hausa, as in *hau* 'to mount' > *haye* 'mounted' or *kāsuwā* 'market' > *kāsuwōyī* 'markets'.<sup>2</sup>

For comparative purposes, therefore, *y* can often be interpreted as a phonetic variant of /w/, as in the following:

child	Musgoi <i>wul</i>	Hausa <i>yāro</i>
ind. obj. marker	Hausa <i>wa</i>	Tera <i>ye</i>
who?	Hausa <i>wā</i>	Sokoro <i>ye</i>

(3) The full range of prosodic contrasts (voiced/voiceless/glottalized) does not occur in syllable final position anywhere in the Chad family, cf. the following:

arrow	<i>xafti</i> (Pidlimdi)	<i>xava</i> (Vizik)
breast	<i>wat</i> (Sokoro)	<i>wudī</i> (Ngamo)
four	<i>vat</i> (Tera)	<i>vada</i> (Jara)
monkey	<i>pet</i> (Gerka)	<i>bido</i> (Bolewa)
night	<i>vitkī</i> (Tera)	<i>vidikti</i> (Pidlimdi)

In describing forms such as Tera [vat] and [vitki], we could say that they illustrate a historical change of \*d > /t/ in a particular environment. On the other hand, it is equally plausible to avoid a narrow phonemic approach and to interpret the Tera forms morphophonemically as {vad} and {vid'ki}. Application of a simple phonological rule would then change these forms into their appropriate phonetic shape.<sup>3</sup> According to

<sup>1</sup> We are in no way implying that distinct palatal phonemes were not present in Proto-Chadic. On the contrary, the fact that so many languages in both the Plateau-Sahel and Biu-Mandara branches do distinguish a series of palatals supports the opposite viewpoint. However, in the absence of phonetically accurate transcriptions of word lists and reliable phonological analyses of the vowel systems of a number of Chadic languages, our guess cannot be verified.

<sup>2</sup> This is a plural of the pattern -*oCi*, where C reduplicates the final consonant in the singular form.

<sup>3</sup> This is the type of argument used by Chomsky [1].

the second interpretation, the change in Tera would be subphonemic and thus would not properly qualify as a historical sound change. The same approach is undoubtedly applicable for other languages with syllable final neutralization.

(4) The replacement of syllable final /-d/ by /-r/ is simply a particular case of the neutralization described above. What is of special interest is that /-d/ has come to be realized phonetically as /-r/ independently in the Plateau-Sahel and Biu-Mandara groups.

	PLATEAU-SAHEL	BIU-MANDARA
four	Hausa <i>fudū</i> , Sura <i>fer</i>	Ga'anda <i>foda</i> , Bura <i>nfwar</i> <sup>1</sup>
night	Ngamo <i>bedi</i> , Sura <i>par</i>	Gudu <i>vidi</i> , Chibak <i>avirvir</i>

#### A NOTE ON METHOD

The identification of cognates and the reconstruction of protoforms is based on the existence of regular sound correspondences. That we are dealing with correspondences and not mere sound resemblances in no way implies an acceptance of Guthrie's [10] insistence that correspondences must be exceptionless (p. 5). 'Exceptions' do arise because of numerous historical factors at work other than sound change, such as analogic change, back formation, tabu, borrowing, etc.

The most well-founded reconstructions in our word list are those based on poly-consonantal forms, where all of the consonants correspond and the number of attested forms are numerous, as in No. 38 'four'. In some cases, the protoform is well-founded but individual citations deviate from the established correspondence. As an example, the protoform for No. 20 'to die' is well constructed on the basis of numerous citations from Plateau-Sahel and Biu-Mandara languages. By including Tera *mədə* as a possible cognate despite the fact that *d* is not an appropriate reflex, we are assuming that \**t* > /d/ in this word is a Tera innovation. We recognize that such citations might be considered as counterevidence which would tend to weaken the validity of the reconstruction. Of course, we could strengthen the reconstruction by leaving out all forms with inappropriate correspondences, but such a procedure cannot be condoned. If, on the other hand, the only two forms available for No. 20 were Hausa *mutu* and Tera *mədə*, then these would be insufficient evidence to assert that the forms are cognate, in spite of their phonetic similarity. Our minimum requirement has been that there be at least one form from both Plateau-Sahel and Biu-Mandara which corresponds appropriately.

Lost syllables are hard to recover in reconstruction, but it is known that reduced forms can result from a variety of types of changes (phonological, morphological, analogical, etc.). In the case where a Plateau-Sahel form, for example, has two consonants and the Biu-Mandara has three and the two consonants which they have in common correspond with each other, then we feel justified in considering the forms cognate even though we cannot at present account for the loss (or addition) of the third consonant. We assume that, were more information available about the languages

<sup>1</sup> The fact that this *r* has not changed to /l/ in accordance with the regular Bura cluster sound shift suggests three possible explanations: (i) the \**r* > *l* change preceded the \**-d* > *r* change; (ii) the [r] which came from \**-d* was phonetically distinct from the [r] which went to *l*; or (iii) the [r] which came from \**-d* and the [r] which went to *l*, while phonetically identical, were 'morphonemically' distinct. Acceptance of the third explanation would entail a rejection of the traditionally held view that phonemes which have merged thereafter have a common history. (The traditional point of view is stated clearly by Hoenigswald [12], p. 117; its rejection has been argued by Halle [11]).

involved, particularly grammatical information, an explanation might be discovered of the kind which has been provided in the notes to Nos. 85 and 97.

Our comparative word list is divided into two sections. List I includes cognates which we consider well-founded on the basis of the requirements stated above. List II contains 'second level confidence' reconstructions. In many cases, these latter reconstructions are based on polysyllabic forms where one pair of consonants corresponds appropriately but no regular correspondence has been established for the other pair, as in No. 135 'to hoe'. In Hausa *hudē* and Tera *ghudā*, the two *d*'s correspond. Hausa *h* and Tera *gh* have not been established as a regular correspondence pair, but neither are they in violation of any of the correspondences which have been established. Consonants which have been reconstructed for such pairs as *h* and *gh* are underlined in the starred form.

Whenever available, a cognate form is listed for each cluster of both groups. Since the languages which comprise a cluster are so similar, we have not listed more than one citation per cluster unless there were some particular reason to include an additional example. The word list is based entirely on detailed comparisons between Plateau-Sahel and Biu-Mandara. Examples from languages in Greenberg's Groups 2, 4, 5, 7, and 8 have not been carefully analysed but rather have been included as additional corroborative material. The section following the word list contains detailed discussions of certain cognates.

Table II lists each language included in this study by the group and cluster to which it belongs. The alphanumeric code (the number corresponds to Greenberg's subgroup designation) is the means by which each language is identified on our comparative word list.

TABLE II.  
*Plateau-Sahel*

HAUSA CL.	NGIZIM CL.	BOLEWA CL.	PLATEAU CL.	SUBGROUP 9
Hausa 1a	Ngizim 1b	Bolewa 1c	Angas 1i	Jegu 9a
		Dera 1d	Ankwe 1j	Mubi 9b
		(Kanakuru)	Gerka 1k	Sokoro 9c
		Gasi 1e	Montol 1l	Somrai 9d
		(Kanakuru)	Sura 1m	Tuburi 9e
		Karekare 1f		
		Maha 1g		
		Ngamo 1h		

*Biu-Mandara*

TERA CL.	BATA CL.	HIGI CL.	BURA CL.	WANDALA CL.
Ga'anda 3a	Bachama 3f	Fali/Kiria 3m	Bura 3p	Wandala 6
(Gabin)				(Mandara)
Hona 3b	Bata 3g	Higi 3n	Chibak 3q	
Jara 3c	Cheke 3h	Vizik 3o	Kilba 3r	
Pidlimdi 3d	Gudu 3i		Margi 3s	
(Hina)	Nzangi 3j		Podowko 3t	
Tera 3e	Sukur 3k			
	Zumu 3l			

## Groups 2, 4, 5, 7, 8

Buduma	2a	Matakam	4a	Gidder	5	Musgu	7	Banana	8a
Gulfei	2b	Mofu	4b			(Muzuk)		(Masa)	
Kotoko	2c	Musgoi	4c					Kulung	8b
Logone	2d								

## PROTO-CHADIC COMPARATIVE WORD LIST

The following notational devices have been used in the reconstructions: \*D, \*G, and \*Z denote obstruents with indeterminate voicing; \*F indicates uncertainty between \*p and \*f. \*N is a nasal with point of articulation indeterminate or neutralized; a grave accent over it indicates that it is syllabic. Dashes indicate vowels; their placement is intended to indicate the syllable structure of the protoforms. Blank parentheses indicate the possibility of another consonant being present in the root form, although the shape of this consonant is doubtful. Consonants or syllables are enclosed by parentheses when there is some question about their belonging to the root of the starred form. Alternative reconstructions are separated by a slash mark.

GLOSS	*-CHADIC	PLATEAU-SAHEL	BIU-MANDARA	2-4-5-7-8
LIST I:				
1. antelope	*g-m-k-	<i>gwamkī</i> (1a) <i>gomoki</i> (1c)	<i>gomox</i> (3e)	
1a. bark (of tree)	*ḡ-r-	<i>ḡāwō</i> (1a)	<i>bara</i> (3b)	
2. beard	*g-m-	<i>ḡemu</i> (1a)	<i>ḡema</i> (3e) 'old man' <i>kumi</i> (3p) <i>kuma</i> (6)	<i>nkumota</i> (2c)
3. big	*g-r-	<i>girmā</i> (1a) <i>garar</i> (1c) <i>kun</i> (1l) <i>sa-gar</i> (9b)	<i>gorā</i> (3e) <i>kila</i> (3p)	
4. blood <sub>1</sub>	*d-N	<i>ḡinī</i> (1a) <i>ḡidum</i> (1b) <i>ḡom</i> (1g) <i>ḡiem</i> (1j)	<i>aḡin</i> (3i)	
5. blood <sub>2</sub>	*b-r-	<i>obor</i> (1b)	<i>vara</i> (3c)	<i>mbeli</i> (5) <i>fel</i> (7)
6. to blow	*F-	<i>fi</i> (1m)	<i>pī</i> (3e) <i>fiu</i> (3p)	
7. to break <sub>1</sub>	*ḡ-( )l-	<i>ḡallē</i> (1a) 'tear up' <i>ḡol</i> (1c)	<i>ḡaxla</i> (3e) <i>ḡia</i> (3f) <i>ḡal</i> (3s)	
8. to break <sub>2</sub> / shatter	*p-s-	<i>fasā</i> (1a)	<i>pātla</i> (3s)	

GLOSS	*-CHADIC	PLATEAU-SAHEL	BIU-MANDARA	2-4-5-7-8
9. breast	*w-d-	<i>wod̄i</i> (1h) <i>wur</i> (1m) <i>wat</i> (9c)	<i>wud̄i</i> (3e) <i>watsu</i> (3l) <i>u'wa</i> (3s)	<i>wa</i> (4c)
10. buffalo	*k-b-n	<i>baunā</i> (1a) <i>kaban</i> (1h) <i>kəbən</i> (1m) <i>kibeni</i> (9b)	<i>ngəvən</i> (3e) <i>ɲfun</i> (3m) <i>fir</i> (3p) <i>kufir</i> (3q)	
11. bull	*g-s	<i>kus</i> (1l)	<i>geɬ</i> (3e)	
12. bush	*g-r-	<i>gura</i> (9b)	<i>gar</i> (3e)	
13. to buy	*m-s-	<i>musāyā</i> (1a) 'to exchange' <i>mas</i> (1b)	<i>masa</i> (3e) <i>masa</i> (3p)	
14. chicken	*k-z-	<i>kāzā</i> (1a) <i>kəzi</i> (1f) <i>kwe</i> (1m)	<i>kuža</i> (3e)	
15. clean	*ɓ-N	<i>baŋ</i> (1i)	<i>boŋ</i> (3e) 'white'	
16. cock	*g-z-	<i>gaza</i> (1b) 'fowl' <i>gaʃa</i> (1c)	<i>gačak</i> (3e)	<i>gomzok</i> (4c) <i>guʃana</i> (8a)
17. to come	*Z-	<i>zō</i> (1a) <i>so</i> (1m) 'to go' <i>suwok</i> (9b)	<i>si</i> (3s) <i>so</i> (6)	
18. cow	*s-	<i>sā</i> (1a) 'bull' <i>suvi</i> (9-Ndam)	<i>dla</i> (3e) <i>ilə</i> (3k) <i>əɬtla</i> (6)	<i>ntla</i> (2c) <i>dla</i> (4c) <i>tle</i> (5) <i>tili</i> (7)
19. crocodile	*k-r-m	<i>kada</i> (1a) <i>kārai</i> (1a) <i>kadam</i> (1c) <i>karam</i> (1d) <i>kut</i> (1i)	<i>ʃiraŋ</i> (3e)  <i>kiram</i> (3o) <i>ŋgələm</i> (3p)	<i>mokriŋ</i> (4c)  <i>kurum</i> (7) <i>hurum</i> (8a)
20. to die	*m-t-	<i>mutu</i> (1a) <i>mutu</i> (1b) <i>mutu</i> (1g) <i>mut</i> (1i) <i>mat</i> (9a)	<i>mədə</i> (3e) <i>amte</i> (3n) <i>mti</i> (3s) <i>mtsamisa</i> (6)	<i>mti</i> (2c) <i>muts</i> (4c) <i>mtə</i> (5) <i>mra</i> (7) <i>mit</i> (8a)
21. dog	*k-r-	<i>karē</i> (1a) <i>karay</i> (9e)	<i>yīdā</i> (3e) <i>kire</i> (3o) <i>kila</i> (3p) <i>kəre</i> (6)	<i>kle</i> (2c) <i>kra</i> (5) <i>herge</i> (7)



GLOSS	*-CHADIC	PLATEAU-SAHEL	BIU-MANDARA	2-4-5-7-8
22. dove	*(N)b-l-	<i>wālā</i> (1a) <i>mbole</i> (1c) <i>mbul</i> (1m) <i>belu</i> (9-Gaberi)	<i>mbōla</i> (3e)	
23. to drink	*s-	<i>šā</i> (1a) <i>asag</i> (1b) <i>se</i> (1g) <i>šwa</i> (1m) <i>suwa</i> (9b)	<i>za</i> (3e) <i>sa</i> (3i) <i>sa</i> (3s) <i>ša</i> (6)	<i>se</i> (2c) <i>sa</i> (4c) <i>sa</i> (5) <i>sa</i> (7) <i>ča</i> (8a)
24. to eat <sub>1</sub>	*z-m-	<i>sum</i> (1i)	<i>zəmə</i> (3e) <i>zim</i> (3i) <i>səma</i> (3p) <i>za</i> (6)	<i>zimi</i> (2c) <i>zum</i> (4c) <i>sma</i> (7)
25. to eat <sub>2</sub>	*t-	<i>čī</i> (1a) <i>ta</i> (1b) <i>tī</i> (1g) <i>tua</i> (1k) <i>tua</i> (9b)	<i>nʃə</i> (3e)	<i>ta</i> (8a)
26. egg	*(N)g-(r)	<i>gwaiwā</i> (1a) 'testicle' <i>agwoi</i> (1b) <i>nkie</i> (1k)	<i>ngardī</i> (3e) <i>ngya</i> (3g)	
27. elephant	*g-w-n	<i>gīwā</i> (1a) <i>ʃiwnak</i> (1b) <i>yawan</i> (1h) <i>gauyay</i> (9b)	<i>ʃuwan</i> (3e) <i>giwan</i> (3o) <i>čuwar</i> (3s) <i>guwe</i> (6)	
28. to exceed	*f-	<i>fī</i> (1a)	<i>fī</i> (3s) 'to swell'	<i>pia</i> (2c) 'many' <i>fiya</i> (7) 'many'
29. eye	*-d-	<i>ido</i> (1a) <i>da</i> (1b) <i>ido</i> (1g) <i>yit</i> (1m) <i>ude</i> (9a) <i>irin</i> (9b)	<i>yidi</i> (3d) <i>dī</i> (3i) <i>nča</i> (3p) <i>iče</i> (6)	<i>ira</i> (2c) <i>ara</i> (5) <i>aray</i> (7) <i>ira</i> (8a)
30. to fall	*t-d-	<i>tādē</i> (1a) 'to trip'	<i>tədə</i> (3s)	
31. fence	*k-r-	<i>karā</i> (1a) 'cornstalk' <i>kara</i> (1c) 'reed mat'	<i>kara</i> (3e)	
32. filth	*d-kr-	<i>dauda</i> (1a)	<i>dukda</i> (3e) 'dirty water'	

GLOSS	*-CHADIC	PLATEAU-SAHEL	BIU-MANDARA	2-4-5-7-8
33. fire	*w-t-	wutā (1a) wati (1d) wus (1j)	wati (3d)	
34. fish	*k-rf-	kīfī (1a) čarafu (1f)	yirvi (3d) hirfu (3i) kilfa (3p) kəʎe (6)	ki (2c) klif (4c) kilfi (5) helif (7) kuluʎ (8a)
35. to fly/leap	*p-r-	p'aar (1j)	pəra (3b) fəla (3q)	fər (2a) mbir (4c) bara (7)
36. foot/leg	*s-r-	sāwū (1a) šilči (1j)	sārə (3e) sirra (3n) səl (3p) sira (6)	
37. to forget	*m-n( )-	mantā (1a) monti (1c) men (1l)	mona (3e)	
38. four	*f-d-	fudū (1a) fudo (1b) fodo (1c) fer (1m) fada (9b)	foda (3a) fwat (3i) fodu (3q) ufade (6)	fodi (2c) fwod (4c) podo (5) pudu (7) fidi (8a)
39. fowl	*( )k-r-	zakara (1a) 'cock' kokor (9a) 'cock' kuyo (9c)	kara (3c) takur (3k) tsakala (6)	
40. to fry	*Z-r-	sōyā (1a) sura (1c) sur (1i)	zurə (3e) səl (3s)	
41. to give	*b-(r-)	bā (1a) bar (1b) pun (1i) bir (9a)	vərə (3e) vu (3i) va (6)	va (2c) vəl (4c) vul (8a)
42. to go <sub>1</sub>	*ḡ-	ḡə (1d) ḡa (9b)	ḡa (3e) 'to come'	ḡa (8b) 'to come'
43. to go <sub>2</sub> (away)	*d-n-	ḡin (1b) ḡina (1c) ḡi (1m) 'to come' nḡa (9b)	də (3e) da (3g) təra (3s)	deni (2c)
44. to go <sub>3</sub> (out)	*p-t-	ḡita (1a) pete (1c) p'et (1j)	pət (3g) 'to enter'	put (4c)

GLOSS	*-CHADIC	PLATEAU-SAHEL	BIU-MANDARA	2-4-5-7-8
45. goat	*k-	<i>akūya</i> (1a) <i>aku</i> (1b) <i>kwara</i> (1d) <i>karaŋ</i> (9e)	<i>kwata</i> (3a) <i>hutu</i> (3l) <i>ku</i> (3s)	<i>hufu</i> (2c) <i>hawa</i> (5) <i>hiki</i> (7) <i>huda</i> (8a)
46. hawk	*k-l-r-	<i>ɣkālīŋ</i> (1m)	<i>kālārī</i> (3e)	
47. head	*k-(n)	<i>kai</i> (1a) <i>kada</i> (1b) <i>ko</i> (1g) <i>ka</i> (1m) <i>kata</i> (9a)	<i>yin</i> (3e) <i>xan</i> (3o) <i>kər</i> (3s)	<i>ki</i> (2c) <i>ki</i> (5)
48. to hide	*t-k-	<i>tok</i> (1l)	<i>tukwa</i> (3e)	
49. hoof	*k-p-	<i>kap</i> (1k)	<i>kopoto</i> (3e)	<i>kabe</i> (2b)
50. horse	*d-k-	<i>dōkī</i> (1a)  <i>duka</i> (1b) <i>dok</i> (1d) <i>danga</i> (9e)	<i>dox</i> (3e) ‘stallion’  <i>duhu</i> (3i) <i>taku</i> (3p)	
51. house	*b-n-	<i>bēnē</i> (1a) <i>ben</i> (1f) <i>pin</i> (1j) ‘room’ <i>beni</i> (9c) ‘to build’	<i>vine</i> (3j) <i>bire</i> (6)	<i>vane</i> (2c) <i>vin</i> (4-Gisiga) <i>bina</i> (5)
52. in-law	*s-r-	<i>surukī</i> (1a) <i>sur</i> (1i)	<i>sərvəkī</i> (3e) <i>serwa</i> (3g) <i>salku</i> (3s) <i>šola</i> (6)	<i>skul</i> (4c) <i>sula</i> (7)
53. to kill	*D-k-	<i>tuku</i> (1b) <i>duk</i> (1f) <i>tok</i> (1k)	<i>atiki</i> (3t)	
54. knee <sub>1</sub>	*k-r-m	<i>kirm</i> (1i)	<i>kurumə</i> (3e) ‘to kneel’ <i>karim</i> (3o)	
55. knee <sub>2</sub>	*F-r-m	<i>burum</i> (1g) <i>kufurum</i> (1m)	<i>pərum</i> (3c)	
56. knife	*s-G-	<i>askā</i> (1a) ‘razor’ <i>soki</i> (1h) <i>šik</i> (1j)	<i>tlugu</i> (3e) <i>sungato</i> (3f)	<i>sagi</i> (2c) <i>tloho</i> (5)
57. to know	*Z-n-	<i>sanī</i> (1a) <i>zin</i> (1i) ‘truth’	<i>zəni</i> (3c) <i>səni</i> (3s)	<i>sən</i> (2d) <i>sun</i> (4a) <i>sən</i> (5)
58. to laugh	*m-s-	<i>murmušī</i> (1a) ‘smile’	<i>məsə</i> (3e) <i>mos</i> (3l)	<i>m̄bis</i> (4c) <i>mas</i> (5)

GLOSS	*-CHADIC	PLATEAU-SAHEL	BIU-MANDARA	2-4-5-7-8
59. left side	*g-d-	<i>gade</i> (1b)	<i>gədan</i> (3e)	
60. leopard	*w-r-	<i>wurak</i> (1b) <i>mboor</i> (1m) 'lion'	<i>wula</i> (3s) <i>ubəla</i> (6)	<i>bal-gam</i> (5)
61. load	*k-r-	<i>kāyā</i> (1a) <i>karai</i> (1c)	<i>kəla</i> (3p)	
62. many	*g-d-	<i>godoy</i> (1c)	<i>guda</i> (3t) <i>kwottya</i> (6)	
63. meat	*s-(w-)	<i>sowei</i> (1b) <i>su</i> (9a)	<i>dlu</i> (3e) <i>tlui</i> (3o)  <i>tləba</i> (3t) <i>tluwa</i> (6)	<i>tlu</i> (2c) <i>use</i> (4-Muturuua) <i>tlwe</i> (5) <i>dlew</i> (8a)
64. to meet	*g-m-	<i>gamu</i> (1a) <i>gwom</i> (1i)	<i>gāma</i> (3e)	
65. monkey	*b-d-/ *b-r-	<i>biri</i> (1a) <i>buji</i> (1b) <i>bido</i> (1c) <i>pet</i> (1k)	<i>fiče</i> (3a) <i>vidə</i> (3e) <i>pču</i> (3s) <i>vəre</i> (6)	<i>biryā</i> (5) <i>vira</i> (8a)
66. moon	*t-r-	<i>tira</i> (1b) <i>tarya</i> (1g) <i>tar</i> (1j) <i>tere</i> (9a)	<i>ndəra</i> (3c) <i>tire</i> (3n) <i>tere</i> (6)	<i>tra</i> (4c) <i>təla</i> (5) <i>tile</i> (7) <i>tile</i> (8a)
67. morning	*d-m	<i>tam</i> (1i)	<i>dumarī</i> (3e)	<i>dum</i> (4c)
68. mortar (for pounding)	*t-(r)m-	<i>turmī</i> (1a) <i>tūma</i> (1c)	<i>tuɣma</i> (3e)	
69. mud (for building)	*t-ḡ-	<i>tabō</i> (1a)	<i>tabə</i> (3b) <i>čobe</i> (3g)	
70. name	*s-m-	<i>sūnā</i> (1a) <i>sum</i> (1g) <i>sum</i> (1m) <i>sami</i> (9b)	<i>dləm</i> (3e) <i>tlim</i> (3i) <i>tlim</i> (3p) <i>tlima</i> (6) 'ear'	<i>tləmi</i> (2c) <i>dlima</i> (4c) 'ear' <i>tlum</i> (5) <i>tlime</i> (7) 'ear'
71. neck	*w-r-	<i>wuya</i> (1a) <i>wura</i> (1b) <i>wulo</i> (1f) <i>wee</i> (1-Ron) <i>were</i> (9a)	<i>'gura</i> (3e) <i>wura</i> (3i) <i>wulya</i> (3p) <i>wuya</i> (3s) <i>iya</i> (6)	<i>we</i> (2b) <i>wula</i> (4c) <i>wul</i> (5)
72. night	*b-d-	<i>bedi</i> (1h) <i>par</i> (1m) <i>dedem</i> (9b)	<i>vidikti</i> (3d) <i>vidi</i> (3i) <i>vi'yi</i> (3s) <i>vidim</i> (6)	<i>fadē</i> (2b) <i>vədu</i> (4c) <i>duvuk</i> (7)

GLOSS	*-CHADIC	PLATEAU-SAHEL	BIU-MANDARA	2-4-5-7-8
73. nose	*t-n	<i>hančī</i> (1a) <i>tīn</i> (1b) <i>wantīn</i> (1j) <i>iduy</i> (1k) <i>eleno</i> (9a)	<i>čīn</i> (3i) <i>mčīr</i> (3s) <i>əktare</i> (6)	<i>mīčīŋ</i> (4c) <i>čīn</i> (8a)
74. oil	*m-r	<i>mai</i> (1a) <i>mirak</i> (1b) <i>mor</i> (1h) <i>mor</i> (1m)	<i>mar</i> (3e) <i>mar</i> (3i) <i>mal</i> (3s)	<i>mele</i> (5) <i>amel</i> (7) <i>mul</i> (8a)
75. ostrich	*t-l-m	<i>bīčīlmī</i> (1a) <i>tellem</i> (1c) 'giraffe'	<i>telem</i> (3e)	
76. a place	*w-r-	<i>wurī</i> (1a)	<i>wure</i> (3c) 'house'	
77. to plant	*s-k-	<i>šūkā</i> (1a)	<i>tləka</i> (3p)	
78. pot <sub>1</sub>	*b-(r-)	<i>buri</i> (1c) <i>bu</i> (1k)	<i>bo</i> (3e)	
79. to pound grain	*s-(r)p-	<i>surfā</i> (1a)	<i>sūpa</i> (3e)	
80. to pour	*z-( )	<i>zubā</i> (1a)	<i>zə</i> (3e)	
81. to pull	*d-	<i>ǰā</i> (1a) <i>daŋ</i> (1i)	<i>da</i> (3e) 'to lift'	<i>də</i> (7) 'to carry'
82. to put	*s-(k-)	<i>sā</i> (1a)	<i>sa</i> (3e)	
83. quarrel	*k-r-	<i>kōrē</i> (1a) 'drive out'	<i>kara</i> (3e)	<i>kwar</i> (2c) 'battle'
84. ram	*(Ñ)g-m	<i>ngam</i> (1c) <i>ngam</i> (1m)	<i>gam</i> (3e) <i>gammak</i> (3k) <i>gam</i> (3p)	<i>hu-gamla</i> (8a)
85. red	*d-z-	<i>ǰā</i> (1a) <i>dey</i> (1g)	<i>diz</i> (3i) <i>dəzə</i> (3s) <i>ǰa-gana</i> (6)	<i>zey</i> (2c)
86. road/path	*t-(r)b-	<i>turba</i> (1a)	<i>ndəva</i> (3e) <i>təvə</i> (3i)	<i>darba</i> (2c) <i>tive</i> (5) <i>foti</i> (7) <i>fota</i> (8a) <i>salawon</i> (7)
87. root	*s-rw-	<i>saiwā</i> (1a) <i>sorom</i> (1g) <i>sin</i> (1i)	<i>dlar</i> (3e) <i>tlərwa</i> (3i) <i>šallwa</i> (6)	
88. to say <sub>1</sub>	*p-r-	<i>pori</i> (1g)	<i>pəra</i> (3b) <i>pəla</i> (3p)	<i>pel</i> (5)
89. to say <sub>2</sub>	*t-( )-	<i>čē</i> (1a) <i>te</i> (1i)	<i>čə</i> (3s)	
90. to see <sub>1</sub>	*n-	<i>ina</i> (1c) <i>na</i> (1m)	<i>na</i> (3e) <i>na</i> (3l) <i>nan</i> (6)	

GLOSS	*-CHADIC	PLATEAU-SAHEL	BIU-MANDARA	2-4-5-7-8
91. to see <sub>2</sub>	*l-	<i>li</i> (1d) <i>liyap</i> (1m) 'pl.'	<i>la</i> (3r)	<i>lim</i> (4c) <i>ula</i> (5)
92. sheep	*t-m-k-	<i>tumākī</i> (1a) 'pl.' <i>tumšī</i> (1c) <i>tum</i> (1m) <i>tumak</i> (9b)	<i>ndomox</i> (3c) <i>tima</i> (3p)	<i>tema</i> (2c) <i>tamak</i> (4c) <i>time</i> (5) <i>edmak</i> (7) <i>dimi</i> (8a)
93. six	*m-k-	<i>mik</i> (9a)	<i>miki</i> (3b) <i>mukwa</i> (3k) <i>nkwa</i> (3s) <i>unkwehe</i> (6)	
94. skin <sub>1</sub>	*(k-)s-m	<i>šim</i> (1m)	<i>sume</i> (3c) <i>kəzim</i> (3e) <i>kəsim</i> (3p)	
95. skin <sub>2</sub>	*p-n-	<i>pana</i> (9c)	<i>pana</i> (3b)	
96. slave	*d-b-	<i>jebe</i> (1d)	<i>ʃəve</i> (3c)	
97. sleep	*(w-)s-n-	<i>wan</i> (1b) <i>sunā</i> (1c) <i>som</i> (1m) <i>sun</i> (9a) 'dream'	<i>čini</i> (3f) <i>sunī</i> (3p) 'dream'	<i>wisan</i> (2d) <i>wan</i> (4c) <i>sini</i> (5) <i>wesen</i> (7) <i>sen</i> (8a)
98. sore	*t-( )d-	<i>tande</i> (1a)	<i>turda</i> (3e)	
99. spear	*(Ń)g-s-	<i>māši</i> (1a) <i>ngas</i> (1b) <i>gasi</i> (1d) <i>gaši</i> (1i)	<i>ngas</i> (3c) <i>ngwassa</i> (3m) <i>mwasu</i> (3p)	
100. to spit	*t-f-	<i>tōfā</i> (1a) <i>tuf</i> (1c) <i>tuffa</i> (9b)	<i>tef</i> (3g) <i>ntəfə</i> (3s)	<i>tufa</i> (2d) <i>tuf</i> (8a)
101. to steal	*m-r-	<i>mur</i> (1k) <i>marŋ</i> (9a)	<i>mūru</i> (3e)	
102. stick	*z-l-	<i>zila</i> (1f)	<i>zol</i> (3c) <i>zwal</i> (3p)	
103. stone <sub>1</sub>	*p-r-	<i>paŋ</i> (1j)	<i>fera</i> (3b) <i>pire</i> (3n) <i>pele</i> (3p)	
104. stone <sub>2</sub>	*(Ń)d-G-	<i>ndoku</i> (1e) <i>ʃwak</i> (1m)	<i>ndōgu</i> (3e) <i>ntska</i> (3s)	
105. sun/day	*F-t-	<i>afa</i> (1b) <i>poti</i> (1g) <i>pus</i> (1m) <i>fat</i> (9b)	<i>fəda</i> (3d) <i>fete</i> (3j) <i>pəi</i> (3p) <i>vačiya</i> (6)	<i>avadiya</i> (2c) <i>pits</i> (4c) <i>paya</i> (5) <i>futi</i> (7) <i>fat</i> (8a)

GLOSS	*-CHADIC	PLATEAU-SAHEL	BIU-MANDARA	2-4-5-7-8
106. ten	*g-m-	<i>gōma</i> (1a) <i>guma</i> (1b) <i>gum</i> (1d)	<i>gwom</i> (3c) <i>gum</i> (3m) <i>kuma</i> (3p)	<i>kay</i> (2b)
107. termite	*d-( )b-	<i>ǰibā</i> (1a) 'termite nest'	<i>ǰaxba</i> (3d)	
108. three	*k-n-	<i>uku</i> (1a) <i>kwan</i> (1b) <i>kunu</i> (1g) <i>kun</i> (1m)	<i>maxkin</i> (3d) <i>makin</i> (3i) <i>makər</i> (3s)	<i>akəra</i> (2b) <i>huay</i> (7) <i>hindi</i> (8a)
109. to tire	*(Ñ)g-m-	<i>gumā</i> (1a)	<i>ngumə</i> (3e)	
110. tomorrow	*d-(r-)	<i>də</i> (1d) <i>dadar</i> (1m)	<i>doi</i> (3c) <i>dīre</i> (3i)	
111. tooth	*s-n	<i>san</i> (9d)	<i>dlin</i> (3e) <i>dlin</i> (3i) <i>tlir</i> (3p) <i>tlare</i> (6)	<i>tlan</i> (2c) <i>tle</i> (5) <i>šiseŋ</i> (7) <i>šiya</i> (8a)
112. to turn upside down	*k-(r)p-	<i>kifē</i> (1a)	<i>kurpa</i> (3e)	
113. two	*s-r-	<i>širin</i> (1b) <i>sir</i> (9b)	<i>səre</i> (3c) <i>sil</i> (3-Fali/ Jilbu) <i>səda</i> (3q)	<i>sray</i> (4c) <i>sul</i> (5) <i>silu</i> (7)
114. to warm	*d-m-	<i>dīmī</i> (1a) 'warmth'	<i>dəma</i> (3e)	
115. to wash/bathe	*b-n-	<i>bina</i> (1c) <i>vvan</i> (1i)	<i>vənə</i> (3e) <i>pəra</i> (3p)	<i>beno</i> (2a) <i>pen</i> (4a) <i>paŋ</i> (7)
116. water	*( )-m	<i>'am</i> (1b) <i>'ame</i> (1c) <i>'am</i> (1m) <i>ame</i> (9b)	<i>'jim</i> (3e) <i>imi</i> (3o) <i>'yimi</i> (3s)	<i>'am</i> (2c) <i>yim</i> (4c) <i>yem</i> (7)
117. what?	*m-(n-)	<i>mənənē</i> (1a)  <i>ni</i> (1h) <i>me</i> (1i)	<i>nəm</i> (3e) <i>məni</i> (3g) <i>mira</i> (3s)	<i>minni</i> (2a)  <i>midi</i> (5) <i>ma</i> (7) <i>mi-ge</i> (8a)
118. who?	*w-(n-)	<i>wānənē</i> (1a)  <i>we</i> (1i) <i>ye</i> (9c)	<i>wuni</i> (3d) <i>woni</i> (3g) <i>wara</i> (3s) <i>wara</i> (6)	<i>woni</i> (2a)  <i>wa</i> (4a) <i>nawai</i> (5)
119. wing	*(k-)p-k	<i>fikāfikī</i> (1a)	<i>kopax</i> (3e)	

GLOSS	*-CHADIC	PLATEAU-SAHEL	BIU-MANDARA	2-4-5-7-8
LIST II: (Second level confidence reconstructions)				
120. arrow	* <u>k</u> -b-	<i>kib̄ya</i> (1a) <i>piax</i> (1e) <i>ʃibigo</i> (9b)	<i>xafti</i> (3d) <i>xava</i> (3o) <i>ghafo</i> (3s)	
121. to beat <sub>1</sub>	* <u>w</u> -d-	<i>war</i> (1d) <i>mwat</i> (1i) <i>or</i> (9a)	<i>ghwadə</i> (3e)	
122. to beat <sub>2</sub>	*d-G-	<i>dōkā</i> (1a) <i>duku</i> (1f)	<i>dig</i> (3b) <i>digga</i> (3q) <i>dig</i> (3t)	
123. belly	*t-mb-	<i>tumb̄i</i> (1a) <i>tumba</i> (1c) 'navel'	<i>mbu</i> (3e) <i>tumbi</i> (3s)	<i>mbeŋ</i> (2b)
124. bird	* <u>k</u> -d-(n)	' <i>sun'sū</i> (1a) <i>yid'in</i> (1d) <i>yadun</i> (1i) <i>diđuo</i> (9b)	<i>d̄iki</i> (3e) <i>kwadaŋ</i> (3i) <i>d̄ikya</i> (3s) ' <i>jiye</i> (6)	
125. bitter	*d-D	' <i>jedit</i> (9b)	' <i>jot</i> (3e) <i>dadaho</i> (3s)	
126. body	* <u>z</u> -	<i>ʃik̄i</i> (1a) <i>zurwo</i> (1c) <i>zito</i> (9a)	<i>dza</i> (3p)	<i>zezi</i> (2c) <i>zu</i> (5) <i>su</i> (7)
127. bone	* <u>W</u> -s-	<i>kaš̄i</i> (1a)  ' <i>oso</i> (1h) ' <i>jes</i> (1m) ' <i>eso</i> (9a)	' <i>gatl</i> (3e) ' <i>ule</i> (3g) ' <i>yetlu</i> (3p) <i>šeše</i> (6)	<i>hatle</i> (2c)  <i>hetlke</i> (7) <i>sok</i> (8a)
128. bow	*r-gh-	<i>riġha</i> (1d)	<i>r̄i</i> (3e) <i>ragha</i> (3i) <i>laga</i> (3s)	<i>lakae</i> (4b)
129. to do	* <u>k</u> -	<i>yī</i> (1a) <i>č̄in</i> (1i)	<i>č̄ə</i> (3e) <i>ya</i> (3q)	
130. fat	* <u>k</u> -d-r	<i>ki'se</i> (1a) <i>šidor</i> (1c)	<i>ghə'jir</i> (3e)	
131. good	*g-N-	<i>gwan</i> (1c)	<i>nga</i> (3b) <i>nga</i> (3i) <i>gumaguma</i> (3r)	<i>ŋaa</i> (8a)
132. guinea fowl	* <u>z</u> -b-(n)	<i>zābō</i> (1a)	<i>zafan</i> (3c) <i>č̄ivan</i> (3e) <i>tsivira</i> (3p) <i>žabra</i> (6)	<i>zavan</i> (2c) <i>zavuna</i> (5)
133. hair	*g-s-	<i>gāš̄i</i> (1a) <i>saku</i> (1f)	<i>ghos</i> (3e) <i>ŋgusa</i> (3t)	<i>msege</i> (2b)
134. to hoe	*h-d-	<i>hūdē</i> (1a)	<i>ghudə</i> (3e)	



GLOSS	*-CHADIC	PLATEAU-SAHEL	BIU-MANDARA	2-4-5-7-8
135. iron	*y-m	<i>oyum</i> (1c) <i>yam</i> (1k)	<i>yim</i> (3c) <i>iyay</i> (3s)	
136. one	*G-D-	<i>gudā</i> (1a) 'unit' <i>getak</i> (1b) <i>ke</i> (9a) <i>keti</i> (9b)	<i>dā</i> (3e) <i>kute</i> (3n) <i>duku</i> (3p) <i>mtakwe</i> (6)	<i>taku</i> (2c) <i>takan</i> (4c) <i>taka</i> (5) <i>katay</i> (7)
137. pot <sub>2</sub>	*D-gh-l-	<i>tūlū</i> (1a) <i>kile</i> (1d) <i>tughul</i> (1m)	<i>darala</i> (3c) <i>dugu</i> (3n) <i>dege</i> (3t)	
138. pot <sub>3</sub>	*t-k-N	<i>tukunyā</i> (1a)	<i>tuxum</i> (3p)	
139. rat	*G-g-m	<i>kūsu</i> (1a) <i>kosum</i> (1c) <i>gozum</i> (1i)	<i>ghum</i> (3e) <i>kuma</i> (3t)	<i>gsumi</i> (2c) <i>kusum</i> (7)
140. to rise	*t-s-/*s-t-	<i>iāši</i> (1a)	<i>ilata</i> (3p)	
141. to tear	*b-(r)k-	<i>barkē</i> (1a)	<i>byaxa</i> (3e)	
142. to tie	*g-n-	<i>weni</i> (1f) <i>ewen</i> (9b)	<i>gəna</i> (3e)	<i>kən</i> (4c) <i>nigi</i> (7) <i>ʃun</i> (8a)
143. to wean/ to take away	*d-( )k-	<i>darukē</i> (1a)	<i>darə</i> (3e)	
144. white	*p-r-t-	<i>farī</i> (1a) <i>fetere</i> (1h) <i>pia</i> (1m) <i>feret</i> (9b)	<i>pipet</i> (3b) <i>puput</i> (3i)	<i>berde</i> (2b) <i>barbara</i> (5)

## EXPLANATORY REMARKS ON COGNATES

## 1. 'antelope'

The Hausa (1a) form cited is from the Katsina dialect. It shows that standard Hausa *gwan̄kī* has assimilated the nasal to the following velar.

## 10. 'buffalo'

Hausa /u/ < \*k is still evident in the plural form *bakānē*, see Klingenberg's law, op. cit. \*b > Hausa /b/ possibly occurred in the course of metathesis. Regarding sporadic sound change in Hausa, Parsons [26] has observed that 'any consonantal phoneme in a Hausa word, and particularly the initial consonant, may without change of meaning be replaced by another consonantal phoneme, which is either (a) of the same organic group, or (b) has the same prosody. . . . ' He has also noted that ' . . . metathesis [is] a very common feature in Hausa . . . ' (p. 379). As for the initial nasal in Fali of Kiria (3m), it is another example of a nasal element inexplicably added to a word in the Biu-Mandara group.

## 16. 'cock'

The reflex of \*k in final position in Tera (3e) is /-ɣ/. However, final /-k/ does presently occur in Tera, usually in words denoting living creatures, i.e., animals, birds, and insects. These /-k/'s are perhaps a remnant of an obsolete suffix.

## 17. 'to come'

A look at Hausa today provides us with an insight as to why we find reflexes of 'to come' under the meaning for 'to go' and vice versa (see Nos. 42, 43, and 44). The pairs *tafi/tafō* and *jē/zō*, the first member of each pair meaning 'to go' and the second member (ending in /ō/) meaning 'to come' show that the direction of the motion is not indicated in the root of the verbs.

## 19. 'crocodile'

The change of \*r > /d/ in this word was probably a later innovation which spread throughout the Plateau-Sahel group. P-S languages spoken on the periphery of the Plateau-Sahel area, however, retained the older form with /r/, e.g., Dera *karam* and North Hausa *kārai*, cf. standard Hausa *kada*.

## 20. 'to die'

This item is remarkable in that a cognate form is found in almost every one of the fifty languages studied here. Tera (3e) is often characterized by sporadic appearances of glottalized reflexes for non-glottalized protophonemes (see also Nos. 21, 43, 65, 71, and 105).

## 21. 'dog'

Given \*k before front vowel goes to /y/ as well as sporadic glottalization in Tera, the form *yīda* might actually be cognate with citations such as Hausa (1a) *karē*, in spite of the considerable phonetic differences.

## 22. 'dove'

For this to be a Chadic cognate, we are assuming that \*( $\hat{N}$ )b > /m̃b/ in Tera, the prenasal element thus preventing the expected \*b > /v/ shift.

## 23. 'to drink'

A likely explanation for the voicing in Tera (3e) is the close association of this word with the word *zəmə* 'to eat'. Sound laws are not exceptionless because other factors are constantly operating, such as the influence which words exert on other words with which they are associated. For an excellent discussion of the role of analogy in African languages, see Klingenheben [14]; for an older discussion of the same problem, see Malkiel [21].

## 26. 'egg'

Abraham [31] notes that the Hausa (1a) words for 'egg' and 'testicle' come from the same root, and similarly in Arabic (p. 350).

## 29. 'eye'

Since the /r/ which is present in all of the languages of the third column is also found in Mubi (9b), a Plateau-Sahel language spoken in the same geographical area as these others, we can best interpret \*d > /r/ not as a regular sound shift but as a local innovation which spread throughout a limited geographical area.

## 33. 'fire'

Final \*t > /-s/ occurs sporadically in the Plateau cluster, see also No. 105.

## 34. 'fish'

Examples such as this provide conclusive proof of the unity of the Chad family of languages. Cognate forms are found throughout the entire family except for Group 9.

Since the cognate is a trilateral root each of whose consonants display regular correspondences in the various languages, the chance factor is completely eliminated. The fact that the numerous forms are phonetically dissimilar increases rather than decreases our confidence in their status as cognates. (We are reminded of Hoenigswald's [12] statement: 'Thus consensus, or similarity, is not only not needed for proof of relationship; where it cannot be expected considering the presumable time depth since separation, its appearance is suspect rather than welcome' (p. 135)). Hausa (1a) *kīfī* and Pidlimdi (3d) *yirvi* are so dissimilar that borrowing is out of the question. Yet it can be shown that they are both reflexes of the Proto-Chadic form *\*k-rf-*. In Hausa, we simply have a change of syllable final *\*-r > /-y/*. In Pidlimdi, we have an instance of */yi/ < \*ki*. The persistence of */f/* elsewhere in Biu-Mandara shows that Pidlimdi */v/* resulted from later assimilatory voicing.

35. 'to fly/leap'

*\*p* is reconstructed on the strength of the Angas (1j) and Hona (3b) forms. We cannot explain */f/* in Chibak (3q).

36. 'foot'

The derivation for the Hausa (1a) form would be *\*s-r- > \*sāyū > sāvū*. The form *sāyū* is still found in Katsina and Northern dialects.

38. 'four'

This is one of the most widespread Chadic cognates, occurring in every language included in our study. Forms transcribed with */d/* rather than */d̥/* are invariably taken from sources which failed to differentiate implosives from non-implosives. We can safely predict that a more accurate transcription of these languages would indicate a glottalized consonant for these forms.

41. 'to give'

The apparently independent loss of the */r/* plus vowel syllable throughout the language family raises doubts as to whether it belonged to the verb root of the protoform.

43. 'to go<sub>2</sub>'

Glottalization in Tera (3e) perhaps arose by analogy with the word *ba* 'to come', see Malkiel, op. cit. [21].

45. 'goat'

Final *-ya* is a feminine suffix in Hausa (1a). In Ga'anda (3a), *-ta* is a remnant of the widespread Afro-Asiatic */t/* feminine marker.

50. 'horse'

When dealing with a 'non-basic, culture-bound' term such as this, one must always suspect borrowing. The following factors suggest that the Biu-Mandara forms are true cognates, and not loanwords from Hausa (1a) *dōkī*. (a) There is no historical evidence to indicate any Hausa influence in the Biu-Mandara area until the British arrived. Formerly, this area fell within the Kanuri sphere of influence and most Tera (3e) words for kinds of horses and equipment connected with horses (bridles, saddles, etc.) are recognizable loans from Kanuri. This possibly includes the generic term for 'horse' in Tera, *pərsə*. It is unlikely that the Tera would borrow a full range of terms falling within

a semantic grouping from one language, Kanuri, and borrow only one particular word in the same semantic field from some other language, Hausa. (b) Tera *dox* means 'stallion' only and is never used in the generic sense. We can explain this by assuming that the original Chadic word *dox* was not replaced when *pərsə* was borrowed; rather, it became semantically restricted to one of the meanings it already had. (c) The possibility of these forms being borrowed from Hausa in the past sixty years is ruled out by their phonetic shape, for the following reasons: (i) it is unlikely that the Tera would replace a word of the favoured CVCV type for one of the less common CVC pattern; (ii) the replacement of syllable final *\*k* by */-x/* indicates that this is an old form since final */-k/* does occur in present-day Tera; and (iii) if we look at Bura (3p) *taku*, we note that regular devoicing has taken place; recent loans retain voiced consonants (see earlier discussion in text).

## 52. 'in-law'

The final *-kī* in Tera (3e) is a suffix used with kinship terms.

## 54, 55. 'knee'

Although it cannot be demonstrated at present, it seems likely that these two reconstructions are derived from the same etymon, in which case, the following forms might also prove to be cognate: Ngizim *kofu*, Jegu *gifo*, Gidder *takpuro*, Musgoi *gurfa*, and Mubi *gip*.

## 56. 'knife'

The voicing in Tera (3e) is probably a result of a previously existing intrusive nasal, still evident in Bachama (3f). Bachama is one of the few Biu-Mandara languages without lateral fricatives.

## 58. 'to laugh'

The Hausa (1a) form is a simple reduplication, *musmusi*, in which the syllable final dental has automatically changed to */R/* according to Klengenheben's law, and the */s/* has palatalized before a front vowel. It is possible that Ngizim *gamas*, Mubi *gemis*, and Higi *gusi* are cognate forms, in which case a fuller reconstruction would be *\*g-m-s*.

## 67. 'morning'

Tera (3e) *-rī* is a suffix, cf. *fəda* 'sun/day' (No. 105) with *fədarī* 'noon'.

## 70. 'name'

According to Lukas (personal communication), Hausa (1a) *sūnā* comes from *\*sumnā*.

## 71. 'neck'

The independent change of *\*r > /y/* in Hausa (1a) and in some Biu-Mandara languages suggests that a more detailed reconstruction would show that *\*r* was already palatalized.

## 73. 'nose'

For the *ha*-prefix in Hausa (1a), see Leslau [17]. The voiced alveolar in Gerka (1k) is not yet explicable.

78. 'pot<sub>1</sub>'

Both the Bolewa (1c) and Gerka (1k) forms are taken from earlier writers who failed to mark glottalization (Benton [33] and Fitzpatrick [36]). We are assuming that these should both be transcribed with *ʔ*.

## 82. 'to put'

In Hausa a falling tone is indicative of a lost syllable. Words such as *sâ* 'to put' and *cè* 'to say' were undoubtedly derived from words of the form CVCV.

## 85. 'red'

Detailed information available on Hausa grammar and phonology makes it possible to provide an explanation for the loss of a syllable in the Hausa (1a) word *ǰā* < \**d-z-*. Given the protoform, the word would have been disyllabic like *fari* 'white', *bakī* 'black', and other sensory terms. It is not unlikely that it ended in *-i* (see Parsons [26]). Since both /d/ and /z/ go to [j] in the environment of front vowels, \**dizi* > \**ǰiǰi* would have been a simple conditioned change. With identical consonants in both syllables, \**ǰ-ǰ-* was probably interpreted as a reduplicated form meaning 'reddish' on the pattern of other reduplicated color terms, e.g., *fari-fari* 'whitish' and *baki-baki* 'blackish', and by a process of back formation, *ǰā* came to have the meaning 'red'.

90. 'to see<sub>1</sub>'

Hausa *nūnā* 'to show' might be related to this form.

## 93. 'six'

Greenberg cites forms for this word which are similar to Hausa *šidā*, but we have found no similar Biu-Mandara forms.

94. 'skin<sub>1</sub>'

The /s/ in closely related Jara (3c) shows that the voicing of the spirant in Tera (3e) is an innovation.

## 97. 'sleep'

The explanation for the loss of \**w-* has been provided by Greenberg [8]: 'In Semitic languages, verbs with initial /w/ in the perfective have forms without /w/ in other tenses and in the derived noun' (p. 48). He gives as a Chadic example the Logone forms *wisan* 'he slept' but *san* 'the act of sleeping'. We know that in Hausa and Tera the words for 'sleep' and 'dream' are nouns. It is very likely that the forms listed here, which are from languages about which we do not have such grammatical information are also nouns, and thus lack the /w/ historically present in verb forms.

103. 'stone<sub>1</sub>'

The Ankwe form (1j) was taken from Fitzpatrick. We are assuming that a proper transcription would be *p'ay*.

## 105. 'sun/day'

The innovation \**t* > /*d*/ in Pidlimdi (3d) perhaps came about under the influence of the word for 'night' *vidikti*, see discussion of No. 23.

## 124. 'bird'

The reconstruction is based on the comparison of *y-d-n* in Dera (1d) and Angas (1i) and *k-d-n* in Gudu (3i), with the assumption that /*yi*/ has developed from \**kyi*. Hausa (1a) and Mubi (9b) are interpreted as reduplicated forms, with the /*k-*/ syllable having been lost. For the Hausa form to be cognate, the change from /*d*/ to /*s*/ (or /*ts*/) would have had to occur also. The other Biu-Mandara citations are assumed to have undergone metathesis.

## 126. 'body'

In both this word and in the word for 'mouth' (Hausa *bākī* and Jegu *beto*), Hausa (1a) has an ending /-kī/ and Jegu (9a) an ending /-to/. In modern Hausa, /-kī/ is an inseparable part of both these words, but the comparative data suggest that at an earlier period it was a suffix whose function has since been lost.

## 127. 'bone'

The regular occurrence of some sort of glottalized velar in the many citations for this word suggests that Proto-Chadic had at least one other glottalized consonant in addition to \**ḡ* and \**ḏ*. Such sounds as ejective /*k̥*/, implosive palatal stop /*ɟ̃*/, laryngealized palatal semivowel /*ỹ*/, and simple glottal stop /*ʔ*/ are phonetically quite different, but they all share two features, one positive and one negative: (1) the presence of a glottal component, and (2) the fact that they are *not* labial nor alveolar.

## 141. 'to tear'

For another example where \*-( )*k*- is reflexed as /-x-/ in Tera (3e), see No. 143.

## THE QUESTION OF BORROWING

The documentation of regular sound correspondences and detailed grammatical similarities between languages does not in itself prove common origin, for the possibility remains that the similarities could be due to borrowing. Meeussen [22] makes this point in his review of Greenberg: 'It is obvious that mass comparison excludes chance but the author [i.e., Greenberg] makes no attempt to demonstrate how it excludes the multi-form possibilities of borrowing' (p. 171).

Since borrowing presupposes some type of historical contact, we maintain that non-linguistic data may be introduced to determine whether phonetically similar forms are cognates or loanwords. Objections to using non-linguistic data came about as a reaction to early 20th-century classifications of African languages on the basis of ethnological and racial considerations. Today there is, we hope, general agreement that non-linguistic data of questionable validity or relevance must be disregarded; however, where reliable demographic, geographic, cultural, and historical data exist, we see no reason why they should be excluded on a priori grounds. In deciding whether resemblances are due to borrowing or to genetic relationship, the burden of proof does not rest on the one viewpoint or on the other. Rather, both hypotheses should be evaluated to determine which is the more probable. In making this decision, all available evidence should be taken into account, not just strictly linguistic evidence.

In the Chadic area one cannot ignore the historical fact that there has been long and continuous Arabic influence on the Hausa (as well as on the Kanuri). In citing forms from Hausa (which is hypothesized to be genetically related to the Semitic languages), one must always take into account the possibility that they may be loanwords from Arabic. On the other hand, Arabic influence did not extend directly to the pagan peoples of the Jos Plateau or the Biu-Mandara area. Therefore, the existence of a form in one of these languages can help us determine whether a similar form in Hausa is an Afro-Asiatic cognate or an Arabic loan. Olderogge [25] has pointed this out: 'In some cases, it is possible to prove that a Semitic [read Hausa] word is of Semito-Hamitic origin and has not been borrowed from the Arab language, owing to the fact that the

word occurs in the languages of tribes which have not undergone the influence of the Islam and Moslem culture' (p. 800). He then cites Hausa *sama* 'sky' as a word which was previously thought to be an Arabic loan but which he now concludes to be a true cognate because of its presence in other Chadic languages, Logone *sama*, Mandara *samaya*, Gudu *zim*.<sup>1</sup> Olderogge's procedure is sound, but in this case he has made an error because he failed to take into account *all* the relevant geographical and historical information. The Chadic languages which he cited as being beyond the range of Arabic influence do fall under the influence of the Kanuri, whose word for 'sky' is of similar shape, *sami*. The Logone, Mandara, and Gudu forms are most likely loans from Kanuri, which undoubtedly borrowed the term from Arabic; thus, they cannot be used to support the assertion that Hausa *sama* is an old Chadic form. The fact that *sama* is also found in Malinke, a Niger-Congo language of Mali, further indicates the ease with which this word has been borrowed under the influence of Arabic religious and cosmological ideas.<sup>2</sup> Since the Hausa, like the Malinke and Kanuri peoples, were subject to this influence, it is likely that they too borrowed this word.

The Kanuri have politically and culturally dominated northeastern Nigeria and the Northern Cameroons for the past 500 years or so. One therefore expects to find considerable evidence of Kanuri linguistic influence throughout this area. Chadic words which are similar in form and meaning to Kanuri words are thus immediately suspect as possible loans. Often they can be easily identified as such either because of their phonological shape or because they fall within certain semantic categories, such as terms for horse accessories, types of weapons, etc. For example, Greenberg includes the following Chadic forms for 'ass' in his Afro-Asiatic word list, but it can be shown that these forms were borrowed from Kanuri, cf. Bolewa *koro*, Tera *kōro*, and Margi *kvara* with Kanuri *koro*. To be a true Chadic item, the Margi form would have to be *\*kwala*, i.e., it should reflect the regular *\*r > /l/* shift characteristic of the Bura cluster. Furthermore, we learn from early reports by British district officers that donkeys were not traditionally used by the 'pagan' tribes of northeastern Nigeria.<sup>3</sup>

Because of the large number of words in Chadic languages which are demonstrably borrowed from Kanuri, it would seem justifiable to extrapolate to less clearcut cases and tentatively assume that they too were loans from the 'upper' language Kanuri to the culturally 'lower' Chadic languages. If due weight is given to the possibilities of borrowing, then the following items from Greenberg's comparative Afro-Asiatic word list must be considered highly doubtful, in addition to the items 'sky' and 'ass' discussed above.

	CHADIC	KANURI
antelope	<i>ngəri</i> (Buduma) 'gazelle'	<i>ngəri</i> 'gazelle'
black	<i>tsillim</i> (Buduma)	<i>sələm</i>
forest	<i>deli</i> (Logone)	<i>dəli</i> 'uninhabited country'

The Chadic forms given by Greenberg for these words are almost all from languages spoken in the Kanuri area. The Buduma people and the Buduma language in particular

<sup>1</sup> These forms were taken from Greenberg, 1950; they were retained in the 1963 edition.

<sup>2</sup> This form was cited by T. Menegrelis [23]. The same word is also found in Fulani.

<sup>3</sup> Official government reports dating back to 1906 were seen in the Biu Divisional Office in Biu town.

are known to have been greatly influenced by the Kanuri. Greenberg does include a form *ʃiri* 'roan antelope' from Ankwe, a language spoken on the Jos Plateau outside the Kanuri area, but this evidence is weak when compared with the identity in form and meaning (a particular kind of 'antelope') of the Buduma and Kanuri forms.

In our comparative word list, nevertheless, we have included certain items which we consider to be true Chadic cognates in spite of the existence of phonetically similar Kanuri forms, for example:

GLOSS	*-CHADIC	PLATEAU-SAHEL	BIU-MANDARA	KANURI
dog	*k-r-	<i>karē</i> (Hausa)	<i>kila</i> (Bura)	<i>kəri</i>
head	*k-(n)	<i>kai</i> (H)	<i>kər</i> (B)	<i>kəla</i>
sheep	*t-m-k-	<i>tumākī</i> (H)	<i>tima</i> (B)	<i>dimi</i>

In all these cases the forms are widespread throughout the Chadic area and display phonological features characteristic of true Chadic cognates. For example, we can cite the following relevant facts about the item 'dog': (1) Hausa *karē* has a flap /r/ rather than the rolled /R/ often found in loanwords from Kanuri; (2) the Hausa form has an /a/ rather than the /i/ which is usually substituted for /ə/ in loanwords from Kanuri [7]; (3) Bura *kila* reflects the regular \*r > /l/ shift (cf. this with *kwara* 'ass' where the shift did not occur); and (4) Tera *yīda* (if it is cognate) displays the obsolete \*ki > /y/ shift.

How are we to explain these similarities between Kanuri words and true cognates? Some cases will undoubtedly prove to be chance resemblance. These will become apparent when a thorough comparison has been made between Kanuri and other Nilo-Saharan languages. Some cases may be borrowings from Arabic. Since Arabic and the Chad family are distantly related, a Chadic retention and a Kanuri borrowing could well be similar. Finally, it is not at all unlikely that the Kanuri borrowed some words directly from their Chadic neighbors, especially words for indigenous flora and fauna.

#### CONCLUSION

In this paper we have demonstrated that the Chad family does constitute a valid linguistic unit. This proof is based on the traditional comparative method as developed by 19th-century European philologists. Consonants of a protolanguage were reconstructed and sound laws were described to account for changes within various language clusters. Of special interest was the conclusion that Proto-Chadic did not have a set of prenasalized unit phonemes as was previously hypothesized. A list of reconstructed Proto-Chadic lexical items was presented along with reflexes drawn from the two major groups of Chad; a discussion of individual forms was included. Finally, the question of linguistic borrowing was raised with special reference to the prominent position of the Kanuri in northeastern Nigeria.

The comparative and historical study of Chadic languages is in its infancy. Our work on the consonants and lexicon is a starting point; much research needs to be done on vowels, tone, and syntax. It is hoped that this paper will provide an impetus for further study which will thereby lead to a fuller picture of Proto-Chadic and a more accurate description of subgrouping relationships within the Chad family.



## INDEX OF LANGUAGES

Each language is listed alphabetically with the language cluster to which it belongs and the bibliographic sources which have information on it (numbers in brackets).

- Angas: Plateau cluster, [37, 43, 45, 58].  
 Ankwe: Plateau cluster, [36, 58].  
 Bachama: Bata cluster, [52, 58].  
 Banana (Masa): Subgroup 8, [48, 53].  
 Bata: Bata cluster, [33, 53].  
 Bolewa: Bolewa cluster, [33, 52].  
 Buduma: Subgroup 2, [33, 49].  
 Bura: Bura cluster, [35, 39, 52, 58].  
 Cheke: Bura cluster, [52].  
 Chibak: Bura cluster, [40, 52].  
 Dera (Kanakuru): Bolewa cluster, [30, 52, 58].  
 Fali of Kiria: Higi cluster, [25].  
 Ga'anda (Gabin): Tera cluster, [52, 54].  
 Gasi (Kanakuru): Bolewa cluster, [30].  
 Gerka: Plateau cluster, [36, 46].  
 Gidder: Subgroup 5, [53].  
 Gudu: Bata cluster, [52, 54].  
 Gulfei: Subgroup 2, [48].  
 Hausa: Hausa cluster, [31, 32].  
 Higi: Higi cluster, [52, 58].  
 Hona: Tera cluster, [52, 54].  
 Jara: Tera cluster, [52, 54].  
 Jegu: Subgroup 9, [42].  
 Karekare: Bolewa cluster, [52].  
 Kilba: Bura cluster, [52, 58].  
 Kotoko: Subgroup 2, [38, 53].  
 Kulung: Subgroup 8, [48].  
 Logone: Subgroup 2, [38, 47].  
 Maha: Bolewa cluster, [56].  
 Margi: Bura cluster, [33, 41, 52, 58].  
 Matakam: Subgroup 4, [8].  
 Mofu: Subgroup 4, [8].  
 Montol: Plateau cluster, [36, 46].  
 Mubi: Subgroup 9, [48].  
 Musgoi: Subgroup 4, [33, 53].  
 Musgu: Subgroup 7, [48, 50, 53].  
 Ngamo: Bolewa cluster, [52, 56].  
 Ngizim: Ngizim cluster, [52].  
 Nzangi: Bata cluster, [33, 52].  
 Pidlimdi: Tera cluster, [52, 54].  
 Podowko: Bura cluster, [48, 53].  
 Sokoro: Subgroup 9, [33].  
 Somrai: Subgroup 9, [33, 48].  
 Sukur: Bata cluster, [52].  
 Sura: Plateau cluster, [43, 44, 58].  
 Tera: Tera cluster, [52, 54, 55].  
 Tuburi: Subgroup 9, [48].  
 Vizik: Higi cluster, [52].  
 Wandala: Wandala cluster, [48, 52].  
 Zumu: Bata cluster, [52].

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\* These articles were not seen in time for the present study.

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