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LINGUA POSNANIENSIS

REVIEW OF GENERAL
AND COMPARATIVE LINGUISTICS

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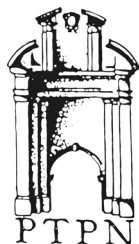
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we współpracy
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LINGUA POSNANIENSIS

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Casting a new ‘eye’ on an elusive suffix: The use and origin(s) of Japanese dialectal suffix ‘-me’¹

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Abstract: In several regions of Japan, various dialects exhibit a peculiar suffix *-me*, which mostly attaches to animal names, and seems to carry out various functions. The exact nature of its use is, to some extent, still unclear, since this *-me* is alternatively described as expressing endearment, familiarity or smallness, or, on the contrary, depreciation, fear or distance (which lead to some authors regarding it as two different homophonous suffixes). On a more grammatical scale, its relationships with definiteness, with plural and collective number and with animacy have also been questioned. Thus, this article aims at examining the different uses of *-me* in Japanese dialects, and its possible connection with other suffixes, in order to tackle the question of its origin(s).

Keywords: Japanese, dialectology, lexicology, suffixation, lexical semantics

Introduction

Although they are separated by hundreds of kilometres, several Japanese varieties or topolects reportedly exhibit a peculiar *-me* suffix that appears to be unused in the standard dialect of Tōkyō. This suffix usually attaches to animal names, as in: *ushi* ‘cow’ → *ushi-me*. However, its exact function(s) and origin remain somehow problematic, as well as its relationship with other homophonous suffixes.

An animal *-me* suffix has been observed in Japan since premodern times. For instance, it is mentioned as early as 1775 in Koshigaya’s *Butsurui shōko* that people from the Sashima district of Shimōsa province (now Ibaraki prefecture) ‘call [animals] by adding a *-me* mora to the end [of their names]’, as in *mā-me* ‘horse’, *ka-me* ‘mosquito’ or *tonbo-me* ‘dragonfly’ (Koshigaya 1775: 1). A similar observation was quickly made about

¹ Many thanks to Igarashi Yōsuke, Matsukura Kōhei, Irène Tamba and Maxime Bonnet for their comments.

eastern Tochigi dialects by Ōta (1829: 472), then about Hachijō (Kondō 1855: 328). Later on, this suffix was gradually observed in other prefectures: Shiga in 1907, Ōsaka (Higashinari-gun) in 1922, Fukushima in 1932², Nara in 1936 (Tachibana 1936: 153), some parts of Ishikawa, Fukui, Saitama, Tōkyō and Kanagawa prefectures (Morishita 1981: 175), and, finally, in some parts of the Gifu prefecture (Yamada 1984: 1).

Overall³, the reported distribution of the animal suffix *-me* in the Japanese archipelago can be mapped as represented on Figure 1⁴:

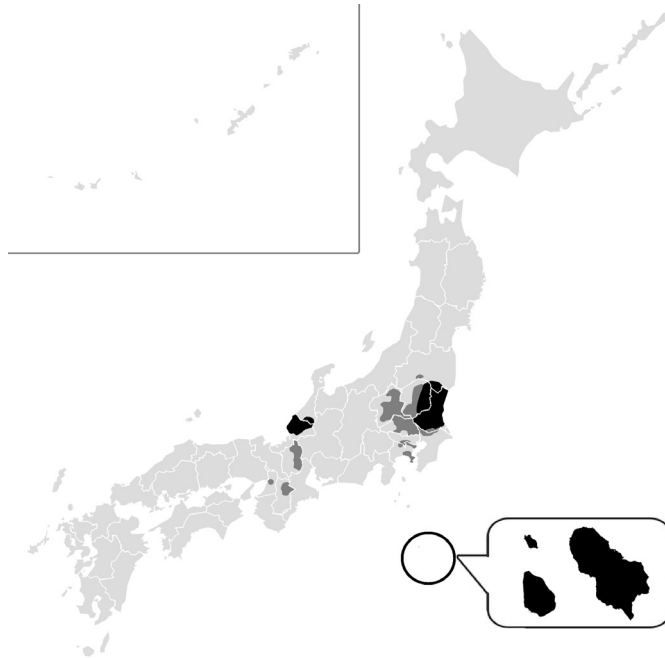


Figure 1: Map of the distribution of the *-me* suffix, with a zoom on the South Izu islands. (The regions where an animal suffix *-me* was reported vivid in the 20th century are displayed in black, regions where it was reported moribund are displayed in dark grey.)

² According to the entry 𪗇 of the *Nihon kokugo daijiten* (Shōgakukan 2001: 1069).

³ According to Yamada (1984: 6), it is also not impossible to consider that traces of a comparable suffix are also attested in other places, since animal names ending in *-me* (and whose cognate do not end in *-me* in standard Japanese) are attested on a few dialect maps; namely: Shimane (Izumo) *gyā-me* ‘frog’ (SJ *kaeru*) or *mokuro-me* ‘mole’ (SJ *mogura*), North Okayama *mokura-me* ‘mole’ (SJ *mogura*), and Miyazaki *kanchorome* and Kumamoto *ogami-me* ‘praying mantis’ (SJ *kamakiri*).

Similarly, a couple of animal names ending in *-me* can be observed in the *Gendai nihongo hōgen daijiten* (Hirayama et al. 1992-1994), such as Miyazaki *chocho-me* ‘butterfly’ (SJ *chō*), or Shimane *mokuro-me* ‘mole’; and there are several similar occurrences in the *Nihon hōgen daijiten* (1989), such as Yamagata (Akumi-gun) *cha-me* ‘cat’ (SJ *neko*), Yamagata (Hidaka-gun) *ari-me* ‘ant’, Shimane (Yatsuka-gun) *kuchinā-me* ‘snake’ (SJ *kuchinawa*), etc. A list of such animal names can also be found in Hino (1946: 146-149).

However, as such, this data is probably too shallow an evidence to include those topolects to the scope of this article.

⁴ This map was made using a Wikimedia blank background, and is mostly based on Morishita (1984: 175), with additional data from the other quoted sources.

In a nutshell, that distribution can roughly be divided into 3 main non contiguous regions, namely, from West to East and North to South:

1. parts of Fukui, Shiga and Ishikawa prefectures (with traces in neighbouring Nara and Ōsaka prefectures),
2. parts of Tochigi, Ibaraki and Fukushima prefectures (with traces in neighbouring Kantō prefectures),
3. the South Izu islands (Hachijō, Kojima, Aogashima).

In all those areas, this suffix seems to have been widespread until recent times. However, due to the pervasion of standard Japanese, it is now gradually falling out of use⁵. For instance, among the roughly 120 animal names in the six-volume *Gendai nihongo hōgen daijiten* (Hirayama et al. 1992-1994), only four varieties appear to have more than one occurrence of a *-me* suffix, namely: Hachijō (55 occurrences), Ibaraki (10), Shiga (8) and Fukui (6).

Nevertheless, its large distribution in non contiguous areas raises some questions:

1. Are all observations of dialectal *-me* occurrences the same phenomenon? If so, what function(s) does this suffix seem to have in the said topolects?
2. If this suffix is indeed a shared feature from those Japanese varieties, is it a shared archaism or a parallel innovation? More generally, what origin can be proposed for this suffix?

These two questions are to be the main considerations of this article, which will mostly focus on data from the South Izu islands (Hachijō, Kojima and Aogashima). However, since the details of this question exceeds by far the scope of this article, no definitive answer to the origin of *-me* will be provided in the second part, but rather preliminary hints that may serve as a starting point for future research.

1. The uses and functions of *-me* in Hachijō

1.1. The animal suffix *-me*

According to the specialist Morishita Kiichi (1979a; 1979b; 1981; 1984), there is no doubt that all of the aforementioned Japanese varieties exhibit one and the same suffix *-me*, rather than coincidental homophones. His definition of this suffix can roughly be summed up into 6 points:

1. *-me* is only used with animal names (1979a: 811),
2. it can be attached to all kinds of animal names, regardless of the animal's type (1979a: 790) or size (1979a: 813). However, different phonetic rules might restrict its use, depending on the variety (1979a: 812-813; 1979b: 141),

⁵ See Morishita (1979a: 816) and Hayano (1991: 94) on its decline in Ibaraki and Tochigi prefectures. See Morishita (1984) on its decline in the Fukui prefecture, and (1979b: 139-142) on its decline on Hachijō island.

3. *-me* is more commonly used with familiar animals (1979a: 813), and possibly more common in appellative occurrences (1979a: 816; 1979b: 135),
4. there is an ‘emotional difference’ in the use or absence of *-me* (1979b: 135). Namely, it would express some kind of endearment (1979a: 789). Therefore, Morishita calls it ‘the *-me* of endearment’ (親愛の「メ」, *shin'ai no 'me'*),
5. *-me* could possibly express finer nuances as well, such as plural (1979a: 816) or diminutive (1981: 172-173), but those connotations are much less clear,
6. its function is essentially different from the homophonous depreciative suffix *-me* (which Morishita calls 罵詈の「メ」, *bari no 'me'* – lit. ‘the *me* of invective’) encountered in Middle Japanese, which also exists in most of those Japanese varieties, but usually attaches to human names and pronouns (1979a: 789; 1979b: 144).

This definition seems quite widely accepted. For instance, the idea that it is more common for familiar animal names and would express some kind of endearment was seconded by Yamada (1984: 3), Nakamoto (1980: 100), Iitoyo et al. (1984: 74) or, more recently, by Iannucci (2019: 94). However, it is probably not useless to check those assertions with the Hachijō data I compiled while preparing my PhD dissertation⁶.

The first thing that can be noted is that the suffix *-me* is (or was) undoubtedly very productive in Hachijō, since it can be found in all kind of utterances, from all topolects, by all genders and all social classes including in the oldest sources⁷. Overall, it can be found in at least one quarter of the roughly 800 animal names I gathered so far. Namely, it can attach to words from all *strata* of Japanese lexicon alike, for instance: *hebi-me*⁸ ‘snake’ (native), *chōchō-me* ‘butterfly’ (Sino-Japonic), *kokko-me* ‘robin’ (onomatopoeic), *horusutan-me* ‘Holstein cow’ (foreign loan). It also occurs both in the oldest inherited lexicon, such as *nuse-me* ‘black kite’ (OJ *nose*), as well as in recent loans such as *kingyo-me* ‘goldfish’ (a recent loan from Tokyo Japanese). However, *-me* appears to be more frequent in distinctly local words, for instance *hototogisu* ‘lesser cuckoo’ rarely occurs with *-me*, while its more local synonym *kokkenkokejō-me* does in most occurrences⁹.

In addition, *-me* can attach on words of any length in Hachijō, for instance *ba-me* ‘cow’ (1 mora), vs. *dēgodanekurē-me* ‘oriental greenfinch’ (8 morae, lit. ‘*daikon*-seed eater’). However, it can be observed that it is usually avoided in compounds: for instance, *tori* ‘bird’ and *mushi* ‘insect’ systematically occur with *-me* when used as a bare root; but without suffix when they are second element of a compound, as in *katō-dori* ‘streaked

⁶ See the appendix of my PhD dissertation (Baudel: forthcoming) for the complete data.

⁷ At this stage, the oldest occurrence I could find was *zoku-me* ‘bull’ in Takahashi (1802). A few years later, the famous Hachijō wordlist found in Ōta (ca. 1811), contains no less than 9 occurrences of *-me*. See Baudel: 2024 for more information on premodern Hachijō sources.

⁸ For simplicity purposes, I use modified Hepburn transcription for both Hachijō and standard Japanese within this article (although the exact realisation of the written forms might locally differ), and Kunrei transcription for Middle and Old Japanese. For other varieties, I simply follow the quoted reference’s conventions.

⁹ Similarly, *dēgodanekurē-me* ‘oriental greenfinch’ also has a more ‘standard’ variant *daikondanekurai* (found in Asanuma 1999), which has no *-me* and an uncontracted pronunciation of the vowel sequence /ai/.

shearwater', or *bun-mushi* 'beetle'. This rule bears almost no exception¹⁰; thus, an occurrence of *-me* after a compound might indicate that it is not synchronically analysed as such any more, for instance *shōto-me* 'turtle dove' (from **shiro+hato* 'white'+ 'dove'), *nyattori-me* 'chicken' (from *niwa+tori* 'garden'+ 'bird') or *mimizuku-me* 'horned owl' (from *mimi+tsuku* 'ear'+ 'owl').

In addition, one can observe that in Hachijō, *-me* can also attach to words that already end with the mora *me* (as in *same-me* 'shark' or *kame-me* 'turtle'); which, according to Morishita (1979a: 812) is not the case in some other varieties. However, the sequence *-me-me* seems to be avoided in longer words: for instance, **tsubame-me* 'swallow' does not occur (while both *tsubame* and *tsubakura-me* do), and *suzume-me* 'sparrow' is a rather rare form (*suzume* being much more common).

More generally, it can be noted that the occurrence of *-me* in Hachijō appears to be largely lexicalized, since many words (in fact, a majority) occur either only in their suffixed version, or only without suffix¹¹. Besides, it can also be noted that *-me* cannot co-occur with an honorific suffix, which is most visible in *kona-sama* 'silkworm' (in which *-sama* is now obligatory) and *nezumi-dono* 'mouse' (which also has a non-honorific variant *nezumi-me*). It can also be noted that *-me* often triggers syncope in suffixed words, causing a variety of sound change (for instance in **shirami* 'louse' > *shan-me*, *numi* 'flea' > *nun-me*, or *heijigara-me* > *heijigo-me* / *heiju-me* 'Japanese tit'), which might play a role in its lexicalization.

In this perspective, it can also be noted that in some rare but notable occurrences, *-me* seems to occur in free variation with an element of composition, such as:

- *tori* 'bird' (for instance in *hiyo-me* ~ *hiyo-dori* 'chick', *uno-me* ~ *uno-tori* 'cormorant', etc.),
- *yo* 'fish' (e.g. *tobi-me* ~ *tobi-yo* 'flying fish', *kingyo-me* ~ *kingyo-yo* 'goldfish'),
- *mushi* 'insect' (e.g. *uji-me* ~ *uji-mushi* 'maggot', *aka-me* ~ *aka-mushi* 'harvest mite'),
- another word (e.g. *goma-me* ~ *goma-fugu* 'tiger puffer', *chōsen-me* ~ *chōsen-ushi* 'red cow' [lit. 'Korean cow']).

In all those occurrences the *-me* form seems to be more common, and it seems most likely that those forms result from a clipping (**u-no-tori+me* → *unome*; **chōsen-ushi+me* → *chōsen-me*); clipping being a very frequent phenomenon in Hachijō.

Due to these clippings, it can also be noted that in Hachijō, in synchrony, adding a suffix *-me* to a human name (such as a kinship term) or an adjective might give it an animal meaning, and more specifically make it refer to cows or to chickens. For instance, *ba-me* 'cow' can synchronically be analysed as *ba* '(grand)mother / aunt' + *-me* (probably from a clipping of **ba-ushi+me* 'mother-cow'). Similarly, there are forms such as

¹⁰ Similar examples include *kubona-me* 'spider', vs *ye no kubona* 'house spider', *yama-kubona* 'wild spider'; *chaccha-me* 'warbler', vs *aka-chaccha* 'robin'; *ushi-me* 'cow', vs *chichi-ushi* 'milking cow', etc.

¹¹ So far, I found only four examples, namely: *ushi(-me)* 'cow', *zokku(-me)* 'bull', *nezumi(-me)* 'mouse', and *yagi(-me)* 'goat'. It is possible that this scarcity is due to a lack of data.

onnago-me ‘young cow / hen’ (lit. ‘woman’+*-me*¹²; from **onnago-ushi*+*-me* and **onnago-dori*+*-me*), *onokogo-me* ‘young bull / rooster’ (lit. ‘man’+*-me*, from **onokogo-ushi*+*-me* and **onokogo-dori*+*-me*), *ko-me* ‘(cow) calf’ (lit. ‘child’+*-me* from **ko-ushi*+*-me*).

This phenomenon was especially productive in the case of cows, as *-me* can attach to:

- a place name: *horusutan-me* ‘Holstein cow’, *chōsen-me* ‘red cow’ (lit. ‘Korean-me’),
- an adjectival root: *kuro-me* ‘black cow’, *hēta-me* ‘tired cow’,
- a verbal noun: *tsukē-me* ‘working cow’, *hijike-me* ‘skinny cow’,
- any noun which acts like a qualifier: *konnyaku-me* ‘spotted cow’ (lit. ‘konjac’+*-me*), *madara-me* ‘pretty cow’ (lit. ‘elegant clothes’ + *-me*).

In most of those occurrences, *-me* is in free variation with either *ushi* ‘cow’ or *zoku* ‘bull’, which seems to indicate that they all result from a productive form of clipping.

Finally, regarding the type of animals, it seems that there is no strong restriction in Hachijō. As a matter of fact, *-me* can attach to all kinds of animal names:

- wild and tamed (e.g. *kamo-me* ‘wild duck’, vs *ahiru-me* ‘domestic duck’),
- positively and negatively perceived (e.g. *nekko-me* ‘cat’, vs *uji-me* ‘maggot’),
- big and small (*kujira-me* ‘whale’, vs *ari-me* ‘ant’),
- unique and in flocks (*pochi-me* ‘doggy’, vs *yuwashi-me* ‘pilchards’), etc.

So far, the only tendency that I could observe is that while *-me* is almost ubiquitous in non-compound bird, reptile, mammal, insect¹³ and crustacean names, it is more rare in fish names¹⁴ and almost unused for shellfish¹⁵.

Thus, in a nutshell, it can be said that Morishita’s point 1 and 2 are quite strong in the case of Hachijō. However, the points 3-6 to appear much less clear. As a matter of fact, *-me* does not seem particularly more frequent in ‘familiar’ animal names than in rarer ones¹⁶, and while both Nitta (2006: 131-133) and Morishita (1979a: 816) consider that the suffix *-me* might also be linked to the expression of plural or collective, it appears that this connotation does not show up in the data either, since I could find no statistical correlation between plural meaning and the use of *-me* (the singular use being slightly more frequent). However, it is possible that what Nitta and Morishita implied when mentioning a ‘collective’ or a ‘familiar’ meaning of *-me* is that this suffix could be more common for *generic* animal names rather than *specific* animal names (for instance in *fugu-me* ‘pufferfish [in general]’, vs *goma-fugu* ‘tiger puffer’, *jiri-fugu* ‘brown-lined puffer’, *bunpei-fugu* ‘purple puffer’, etc.). This last statement is true, but it actually does not say anything about the semantic value of the *-me* suffix *per se*, since (as illustrated with the example of pufferfish names) generic words are most commonly single-root words, while specific animal names are very often compounds; and, as showed earlier, *-me* tends to be avoided in compounds.

¹² It can also be noted that *onna-me* (lit. ‘woman’+*-me*) is a common dialect word for ‘cow’ in Kyūshū, Kansai and some parts of Kantō (see Tachibana 1933). While a striking parallel, this form is however more probably an alteration of the more common *uname* (probably from **ushi-na-me* ‘cow-GEN-female’).

¹³ I use ‘insect’ in a broad sense here; that is, including arachnids, worms, myriapods etc.

¹⁴ For instance, some very common generic fish names such as *katō* ~ *katsū* ‘bonito’, *tē* ~ *chā* ‘sea bream’ or *shake* ‘salmon’ never take *-me*. Besides, the generic word for ‘fish’ *yo* does not either.

¹⁵ The only clear exception seems to be *uni-me* ‘urchin’.

¹⁶ Cf, for instance, very common *hototogisu* ‘lesser cuckoo’, vs very uncommon *hya:daka-me* ‘goshawk’.

Furthermore, Morishita's idea that *-me* would be more common in appellatives and express an 'endearment' meaning is not that clear either. As a matter of fact, while *-me* does occur in some appellatives (as in *kan-me*, *kan'yo-me* 'kitty', or *pochi-me* 'doggy'), this use does not appear statistically more common than any other use in Hachijō, and is, in fact, overall quite rare. Similarly, while the interpretation of *-me* as a diminutive suffix (as suggested in point 5) could make sense on a diachronic perspective (*cf infra*); on a synchronic level however, there does not seem to be an opposition of size between suffixed and unsuffixed animal names, the two forms being used seemingly interchangeably:

- (1) nezumi-**ME**=ga anā ake-tā=de
 mouse-**ME**=SBJ hole.ACC open-PST.RT=CIRC
 Since the mice made a hole... (Asanuma 1999: 78)

- (2) nezumi=ga kabe=ni anā ake-tā=nte
 mouse=SBJ wall=LOC hole.ACC open-PST.RT=CIRC
 Since the mice made a hole in the wall... (Asanuma 1999: 179)

Finally, while it is true that many occurrences of *-me* concern animals that are likely to receive some kind of endearment, such as cattle and pets, one could wonder if there truly is an endearment meaning in words such as *mushi-me* 'insect, pest', *uji-me* 'maggot' or *gejigeji-me* 'millipede', which are highly negatively-perceived animals, the latter even being used as an insult in Hachijō (*cf. Asanuma 1999: 86*). Besides some occurrences of *-me* clearly show a fearful or negative attitude toward the animal, perhaps showing some overlapping with the homophonous human depreciative *-me* (*cf infra*):

- (3) same-**ME**=ni kam-are-te tenpō d-ara
 shark-**ME**=A eat-PASS-CONJ armless be-PST.SS
 He is armless because he was bitten by a shark. (Asanuma 1999: 154)

- (4) nekkō-**ME**=ga [...] katsū-busho hikizuridashi-te bun-nige-tara
 cat-**ME**=SBJ bonito.flake.ACC drag-CONJ INT-run-PST.FIN
 The cat stole my bonito flake and ran away.

kondo tsukamē-te buk-koroshi-te yar-u
 Next.time catch-CONJ INT-kill-CONJ do-PST.SS
 Next time I catch him, I'll kill him! (Asanuma 1999: 249)

Finally, it is interesting to observe that the suffix *-me* can occur even when talking about the inanimate representation of an animal, for instance in:

- (5) kono tsuru-**ME** tsukur-o=wa ezu-kya
 this crane-**ME**.ACC prepare-RT=TOP difficult-ss
 Making this [paper] crane is difficult. (Asanuma 1999: 47)

which means that synchronically, the use of *-me* is not necessarily linked with animacy in the speakers' mind.

In a nutshell, the animal *-me* suffix in Hachijō can be defined as follows:

1. *-me* is found after most animal names, regardless of the type of utterance,
2. it is used for all kinds of animals, with the notable exception of some fish and of all kinds of shellfish,
3. it is usually not found after compounds, and triggers frequent clippings
4. it cannot co-occur with another suffix, and tends to be avoided after the mora *me* in longer words ($> 3\mu$),
5. its distribution is largely lexicalized, and appears to have undergone (at least partial) semantic bleaching.

Because of this semantic bleaching, the animal suffix *-me* appears to occasionally interfere to some extent with the homophonous human suffix *-me* (Morishita 1984: 183). Some authors like Naitō (1979: 108), Yamada (1984: 3), and Nitta (2006: 127-129) even consider that both could, to some extent, be considered two uses of the same phoneme.

Thus, it is probably not useless to take a closer look at the human uses of *-me*, in order to assess on a synchronic level to what extent the two appear to be linked or different; and on a diachronic level whether they share the same origin.

1.2. Other uses of *-me*

A human suffix *-me* also seems to be attested in many Japanese varieties, including the ones which also exhibit an animal suffix *-me*. This suffix is more difficult to observe than its animal counterpart and was possibly less productive. Plausible examples I could find¹⁷ so far include: Shiga (Takashima-gun), *nana-me* 'child', Nara (Uchi-gun) *kogo-me* 'child', Fukushima *yaya-me* 'baby', Yamagata *gakki-me* 'brat', Ibaraki *oto-me* 'child', Tochigi *ani-me* 'big brother' (Nitta 2006: 143), Hachijō *appa-me* 'baby'. As can be seen in these occurrences, this suffix appears particularly common in kinship terms and has a very clear diminutive meaning, since it is mostly found after words that are used to denote or call infants.

In Hachijō, this human diminutive *-me* suffix does seem to have been quite productive, since it attaches to various lexical *strata*: *kodomo-me* 'child' (native), *chōnan-me* 'eldest son' (Sino-Japonic). It is used after several synonyms for 'children' (such as *kodomo-me* 'child', *appa-me* 'baby', *mago-me* 'grandchild'), especially after 'kin numerative'¹⁸ appellatives, such as: (for boys) *tarō-me* '1st son', *jō-me* '2nd son', *sabō-me* '3rd son', *shō-me* '4th son', *gorō-me* '5th son' or (for girls) *nyoko-me* '1st daughter', *naka-me* '2nd daughter', *tego-me* '3rd daughter'; as well as their non-appellative equivalents: *chōnan-me* '1st son', *jinan-me* '2nd son', *sannan-me* '3rd son'; *chōjo-me* '1st daughter', *jijo-me* '2nd daughter', *sanjo-me* '3rd daughter', *yonjo-me* '4th son'. Interestingly, these series illustrate that *-me* is only found after the most common of these words, since the other forms of these series (such as *kusu* '4th daughter', *jīrō* '5th daughter', *kūrū* '6th daughter') are usually

¹⁷ Unless stated, the following forms are quoted from the *Nihon hōgen daijiten* (Shōgaku tosho 1989).

¹⁸ Cf Baudel: forthcoming a, for an overview of 'kin numeratives' in Hachijō.

not suffixed. Similarly, it can be noted that *shiko* 'great-grandchild' and *yashago* 'great-great-grandchild' are usually not suffixed either; which could either be due to their rareness, or to their perception as a compounds (that is, if this human *-me* has the same restriction as its animal counterpart).

Besides, it can be noted that in Hachijō, the human *-me* appears as less lexicalized than its animal equivalent, since it appears completely facultative in most cases:

- (6) kodomo-**ME**-ra=ga heya=no nakā hoger-o=wa
 child-**ME**-PL=SBJ room=GEN=middle.ACC scatter-RT=EMPH
 The children are scattering inside the room. (Asanuma 1999: 209)

- (7) kodomo-ra=ga urusa-ku-te tsun-noboser-o=wa
 child-PL=SBJ noisy-ADV-CONJ INT-get.dizzy=RT=EMPH
 The children's noise is making my head ache. (Asanuma 1999: 149)

- (8) mago-**ME**=wa kawai-ke=nte dēji=ni sh-o=wa
 grandchild-**ME**-TOP cute-RT=CAUS important=CIRC do-RT=SS
 My grandchildren are cute, so I cherish them. (Asanuma 1999: 209)

- (9) mago=ga bō-ku nar-o=wa
 grandchild=SBJ big-ADV become-RT=EMPH
 My grandchildren are growing up. (Asanuma 1999: 209)

As shown from the example above, *-me* can co-occur with other suffixes, especially with the plural marker *-ra*, and the honorific marker *-do*, for instance in *asei-do-me* 'big brother'. In this context, it should be noted that the order of those suffixes appears to be fixed, since **-me-do* or **-ra-me* do not occur. I also found no occurrence of suffix-induced syncope with this suffix (on contrary to the animal suffix in **shirami* > *shan-me*, or *numi* > *nun-me*).

Beside kinship, another very common use of the human *-me* suffix in Hachijō and other varieties is in derogatory words and insults, such as *dongo-me* 'fool', *yakko-me* 'bastard', *fungī-me* 'idiot', etc. In a few Hachijō occurrences, such as *teren-me* 'liar', *yakkē-me* 'troublemaker', this *-me* occurs in free variation with *-mono* 'guy', 'person' and seems to work as an agentive meaning (*teren* meaning 'lie' and *yakkē* 'trouble'). It is likely that similarly to the animal *-me*, this use originates from a clipping (**teren-mono-me* > *teren-me*, **yakkai-mono-me* > *yakkē-me*).

This derogatory *-me* is equivalent to a well-known derogatory or humbleness suffix *-me* (sometimes written as <奴>) which was very common in Late Middle and Early Modern Japanese, and is now given as old-fashioned in dictionaries and grammar books. This suffix is well attested at least since the *Heike monogatari* (early 14th century), in which it can attach to human and animal nouns and proper names alike:

- (10) この程親しき奴めに 盗まれて候ふ
 kono hodo sitasiki yatu-**ME**=ni nusum-are-te saurafu
 PROX INT close-RT guy-**ME**=AGT steal-PASS-CONJ be-SS
 That so very dear fellow stole from us. (Imaizumi 1900: 505)

- (11) その仲綱めに 鞍 置け
 so=no Nakatuna-**ME**=ni kura ok-e
 MED=GEN Nakatsuna-**ME**=LOC saddle put-IMP
 Put a saddle on that Nakatsuna. (Imaizumi 1900: 497)

Occasionally, *-me* is interpreted as having an endearment meaning, especially when following a word referring to a child, for instance in the *Soga Monogatari* (14th century):

- (12) あの童めを おとうと おぼしめせ
 a=no wappa-**ME**=wo otouto=to obosi-mes-e
 DIST=GEN child-**ME**=ACC little.brother=SIM think-HON=IMP
 Consider this child like a little brother. (Anayama 1940: 117)

Later on, there are also many occurrences of *-me* after pronouns. For instance, in the *Arte da Lingoa de Iapam*, Rodrigues gives a short description of *-me*, which he describes as ‘a particle that attaches to nouns and depreciates a lot’ (1604: 162 *recto*), as in: <vonoreme> *onore-me* ‘you (pej.)’, <aitçume> *aitsu-me* ‘that guy’, <coitçume> *koitsu-me* ‘this guy’. He also provides a long example sentence from a lost folktale (the *Kurofune Monogatari*)¹⁹:

- (13) nauo vchixumeramo
 na^wo uti-syu-**ME**-ra=mo
 ADV interior-folks-**ME**-PL=COM

Besides, even the people inside,

corenofutariga amari nurusani ano yatçubara
 kore=no hutari=ga amari nurusa=ni ano yatu-bara
 PROX=GEN 2.ppl=SBJ such leniency=LOC DIST guy-PL

The two of them, being so lazy, those guys,

votocome mo, vonagomemo xōdainai
^wotoko-**ME**=mo ^wonago=**ME**=mo syoodai na-i
 boy-**ME**=COM girl-**ME**=COM shape is.not-ss

Neither the boy or the girl are any good. (Rodrigues 1604: 162 *recto*)

As can be seen in those examples, *-me* seems to be linked to definiteness in Middle Japanese, since it very often occurs after a deictic (*kore no, kono...*) or after a proper noun, which both behave like determinatives (Anderson 2004: 470). Thus, it usually does not occur in an indefinite context. Besides, it can be noted that at this stage, I found no occurrence of *-me* after a completely inanimate noun.

Interestingly, the use of *-me* with a pronoun is not common in contemporary Hachijō, and the only occurrence I could find so far is the premodern *unu-me* ‘you (pej.)’, which

¹⁹ Interestingly, Rodrigues also provides an example of *-me* following an animal name: *inu-me* ‘dog’.

occurs several times in Kakusō (1858 [1984:75]). However, as stated before, *-me* is quite commonly used after names in Hachijō, especially kin numeratives (which are most commonly used as appellative names), and it also appears to be rather rare in indefinite context, as illustrated by the examples below:

- (14) wa=ga e=ni=wa kodomo-ra ga shōbu ar-o=wa
 I=GEN house=LOC=TOP child-PL=SBJ many be-RT=EMPH
 There are *many* children in my house. (Asanuma 1999: 117)

- (15) kodomo-**ME**-ra=ga warusā shi-tā=nte sāg-o=wa
 child-**ME**-PL=SBJ mischief.ACC do-PST.RT=circ=TOP scorn-RT=EMPH
 I'll scorn *the* children: they did mischief. (Asanuma 1999: 103)

Similarly, the use of derogatory *-me* is more frequent in either appellative/vocative use or in definite context altogether, than in other kinds of utterances:

- (16) urya dongo d-ara
 DIST.TOP fool be-SS
 That guy is *a* fool. (Asanuma 1999: 194)

- (17) dongo-me=ga anshī sogan d-ā kotō sho?
 fool-**ME**=SBJ why such be-RT thing.ACC do-RT
 [You] fool, why do you do such things? (Asanuma 1999: 29)

Later on, this Late Middle Japanese suffix also became especially common in Early Modern Japanese following the humble first-person pronouns such as 某 *soregashi*, 拙者 *sessha* or 私 *watakushi*, in order to reinforce (sometimes ironically) their humbleness meaning. This can be seen for instance in Jippensha's picaresque novel *Tōkaidōchū Hizakurige* (1822 [1935: 31]):

- (18) 下拙の私めが 相方の おやまさんは
 gesetsu=no watakushi-**ME**=ga aikata=no oyama-san=wa
 humble=COP I-**ME**=GEN2 partner=COP girl-HON=TOP
 The darling companion who will accompany my humble self..²⁰

Similarly, the *-me* suffix is said to be especially common when talking about one's family or children, for instance in the Japanese translation of *The Last Days of Pompeii*:

- (19) どうぞわたくしの息子めを まもりくださいませ
 dōzo watakushi=no musuko-**ME**=o mamori kudasai-mas-e
 please I=GEN son-**ME**=ACC protect bestow-HON-IMP
 Please, protect my son. (Shibata 1951: 122)

²⁰ The sentence is interrupted in the original.

It is most likely that this use is the origin of the kinship *-me* in Hachijō. However, interestingly, the use of *-me* with the first person pronoun is not attested in Hachijō, and it is quite clear in several examples that the kinship use of *-me* is not limited to one's own family in that variety:

- (20) omi-ra=ga e=no mago-**ME**=wa soccha=n ik-ara
 you-PL=GEN house=GEN grand.son-**ME**=TOP MED=LOC go-PS.RT
Your grandson went this way. (Asanuma 1999: 130)

- (21) omi=ga nyoko-**ME** wa=ga tarō=n
 you=GEN2 1st.daughter-**ME**.ACC I=GEN2=DAT
 yome=ni ke-nnō=ka
 wife=SIM give-NEG.RT=INTER
 Would you give *your* eldest daughter to my eldest son as wife? (Asanuma 1999: 89)

Thus, while it is less lexicalized and bound than the animal *-me*, the human *-me* suffix also appears to be undergoing some semantic bleaching in Hachijō. Interestingly, it can also be noted that this human suffix *-me* was also productive after names of (usually negative) supernatural beings in Hachijō, since there are several forms, such as *kinchi-me* ‘ghost’, *oni-me* ‘demon’, *tenji-me* ‘spirit’, which rarely occur without suffix²¹.

Perhaps more surprisingly, it also occasionally occurs (in a minority of occurrences) with names of meteorological phenomena, such as *tatsu-me* ‘tornado’, *kumo-me* ‘cloud’, and *niji-me* ‘rainbow’, in which a derogatory meaning is not perceptible any more. This use might somehow be ancient, since there are occurrences such as *arashi-me* ‘storm’ in the *kyōgen Setsubun*, dated from the end of the 16th century (Sasano 1956: 406)²².

Finally, there is one last peculiar use of *-me* in Hachijō which makes it function like a bound noun²³, not unlike standard Japanese 者 *mono*. Namely, *-me* cannot occur as an independent word, but it can be qualified by a demonstrative, a proposition or an adjective:

- (22) oso s-o=**ME**=ga ar-i
 lie do-RT=**ME**=SBJ be-NOM
 Since there are *people* who lie... (Kaneda 1998: 27)

- (23) so=no waka-ke=**ME**-ra=ga
 MED=GEN young-RT=**ME**-PL=SBJ
 these young *guys*... (Kindaichi & Shibata 1967: 231)

²¹ Nitta (2006: 127) also relates the same kinds of occurrences in Ishikawa.

²² Alternately, it is also possible that in those few occurrences, human and animal *-me* conflated together, since *tatsu* originally means ‘dragon’, and rainbows in the Chinese mythology are said to be two-headed dragons.

Besides, there are also a couple of occurrences of facultative *-me* for body parts, namely: *hesso-me* ‘navel’ and *chinchin-me* ‘penis’, which probably show a recent extension from humans to human body parts.

²³ Ōshima (1984: 18) sums up that it is ‘used as a formal noun. It may also function as a quasi-substantive particle.’ (形式名詞として使われたもの。さらに準体助詞的働きをする場合がある。)

In the two examples above *-me* acts like a classifier with a plural meaning, but this bound *-me* can also express contrast between two individuals, not unlike English *one*:

- (24) so=no ane=no hō=ga kyoudē d-ō=**ME**=i
 MED=GEN big.brother=GEN side=SBJ younger be-RT=**ME**=LAT
 The elder brother [said] to the younger *one*... (Kaneda & Naitō 2002: 28)

Besides, it can also take an animal or even an inanimate meaning:

- (25) ware=mo mitsuke-tā, nobot-t-ar-o=**ME**
 I=COM find-PST.RT climb-CONJ-be-RT=**ME**
 I also found some climbing *ones* [goats]. (Ōshima 1986: 69)

- (26) ki=no futō-ke=**ME** hoso-ke=**ME** ja=nai darou
 tree=COP large-RT=**ME** thin-RT=**ME** CIRC=NEG CONJECT
 The big *one* of the trees, not the thin *one*. (Ōshima 1986: 23)

- (27) seiro=wa adan d-ō=**ME** tsuka-i yar-ō, omē-ra
 tree=COP how be-RT=**ME** use-NOM do-PST.RT you-PL
 What *kind* of a steamer did you guys use? (Ōshima 1986: 45)

Finally, this *-me* can also have an exclamative function, or simply serve as a nominalizer for the proposition, not unlike Japanese *koto* こと or *no* の:

- (28) ō, okkana-ke=**ME**=no
 yes scary-RT=**ME**=TAG
 Yes, how scary! (Tokyo Metropolitan Board of Education 1986: 22)

- (29) meibo=ga ar-u-**ME**=ga
 register=SBJ be-RT₂=**ME**=ADV
The thing is, I have a register, but... (Aoyagi 1973: 87)

- (30) tor-u=no=wa oku=ni hē-te ar-o=**ME**
 take-RT₂=NOM=TOP deep=LOC go.in-CONJ be-RT=**ME**
 To collect [abalones], [one has] to go deep. (Nakamoto 1984: 160)

To the best of my knowledge, this use appears to be specific to Hachijō, and it might very well be a recent development²⁴. More specifically, given the fact that Hachijō is prone to clippings, I suspect that it originates from a truncation of originally derogative *yatsu-me or *mono+-me (which can refer to humans and objects alike), which then underwent grammaticalisation semantic bleaching.

²⁴ Ōshima (1984: 18) explains that it in the 1980s, this form was most common amongst younger speakers, which might be a hint of its recent formation.

In this perspective, it is not impossible that other dialects exhibit a parallel relexification of the suffix *-me*. For instance, the *Kojima chihō no hōgen-shū* (Togawa 1966: 142) reports a noun ‘*me*’ in Okayama prefecture, which is translated as 奴 *yatsu*, 人 *hito*, 者 *mono* (lit. ‘guy’, ‘person’, ‘-man’), and as *koto* in such syntagms as *ii me / ee me* = いいこと (Togawa 1966: 10, 27). However, no example is provided, and more research is needed in order to assess whether this word shares the same properties with its Hachijō counterpart.

- In a nutshell, it is clear that regardless of their origin, there are at least three different uses of *-me* in Hachijō:
- *-me₁* (as in *ushi-me*), a generic animal suffix that appears to have a very weak semantic value and to be highly lexicalized
- *-me₂* (as in *kodomo-me*, *dongo-me*), a more rare but less lexicalized human diminutive / derogatory suffix
- *=me₃* (as in *okkanake=me*), a nominalising element that lacks any clear semantic value, and probably originated from *-me₂* through clipping

Now, the question remains whether the first two suffixes *-me* share the same origin, and what hypotheses can be formulated on that matter.

2. The possible origins of *-me*

The dominant idea among the various authors that examined the dialectal *-me* suffixes (such as Nakamoto 1980: 100; Nitta 2006: 134-135) is that, although those two elements differ in synchrony, they are most likely sharing the same etymology. While this does seem to be a parsimonious hypothesis, it is also possible that those two forms were originally unrelated but interacted and conflated over the centuries. Besides, there are many possible candidates for their origin, which need to be examined one by one²⁵.

2.1. An origin as a derogatory suffix?

The first root we need to consider as a potential candidate for grammaticalisation is *mé[†]* ‘eye’ < OJ *me₂* (< PJ **may*) which is quite remarkable for its polysemy and diversity of use. Without being exhaustive, we can roughly list the following meanings:

1. ‘eye’, ‘eyesight’, ‘vision’, ‘judgement’ (眼, 目),
2. ‘object of vision’, ‘target’, ‘goal’ (目),
3. ‘dot’, ‘point’ (目),
→ ‘dots of die’ → ‘possibility’, ‘experience’, ‘moment’ (目),
→ ‘graduation’, ‘unit’, ‘item’, ‘weight’, ‘coin’, ‘value’ (目, 匁),
4. ‘small hole’ (目),
5. ‘joint’, ‘meeting point’, ‘intersection’, ‘(biology) genus’ (目),

²⁵ It must be noted that since my main source of data, Hachijō, is an accentless variety, it was not possible at this stage to take the pitch-accent into consideration.

6. 'bud, sprout' (芽),
 7. 'face', 'expression', 'appearance'²⁶, 'grain (of a surface)', 'pattern' (目).

Furthermore, this root is said to have been grammaticalised in several ways in MJ (Kawaguchi 1998), and to occur synchronically as various suffixes (Kō 2004: 230-237):

1. (already in OJ²⁷) as a suffix indicating the place, the moment or the result of the process of a verb root after a verbal noun (from the meaning 'point'):
 - 切る *kiru* 'to cut' → 切り目 *kiri-me* 'end / cutting mark' (lit. 'cutting point'),
 - 縫う *nuu* 'to sew' → 縫い目 *nui-me* 'stitch' (lit. 'sewing point'),
 (by extension) as a suffix indicating the process itself after a verbal noun:
 - 落ちる *ochiru* 'to fall' → 落ち目 *ochi-me* 'decline' (lit. 'falling point'),
 - 控える *hikaeru* 'to hold back' → 控え目 *hikae-me* 'restraint' (lit. 'restraining point').
2. (roughly since the 11th century²⁸) as a degree or approximation suffix after an adjectival root, not unlike English *-ish* (from the meaning 'appearance'):
 - 多い *ō-i* 'numerous' → 多め *ō-me* 'quite numerous',
 - 綺麗 *kirei* 'neat' → 綺麗め *kirei-me* 'very neat'.

If the adjectival root is monomoraic, *-me* attaches to the adnominal form instead:

- 濃い *ko-i* 'strong' → 濃いめ *ko-i-me* 'somewhat strong, strongish'.
3. (since the mid 15th century at least²⁹) as an ordinal marker after a numeral compound (from the meaning 'item'): 一年 *ichinen* 'one year' → 一年目 *ichinen-me* 'first year'.

Besides, as shown by its meanings 'hole' and 'point', this 'me' is also possibly etymologically linked to, or conflating with *ma* 間 'gap', 'interval', 'place' (Kawaguchi 1998: 266-267). Similarly, it might have interacted with the OJ and MJ volitional suffix *-m-*, which was used to create many de-adjectival verbs that were gradually reshaped into vowel verbs in *-eru* (first 下二段, then 下一段) in MJ; yielding verbal nouns in *-me*:

- 高 *taka* 'high' → 高める *taka-meru* 'to raise' → 高め *taka-me* 'raising',
- 確か *tashika* 'certain' → 確かめる *tashika-meru* 'to ascertain' → 確かめ *tashika-me* 'confirmation'.

All of those uses of *-me* are attested in Hachijō, e.g.:

1. *mūka* 'six days' (SJ *muika*) → *mūka-me* 'the sixth day'
2. *mushiru* 'to pluck' → *mushiri-me* 'plucking mark' (lit. 'plucking point')
3. *katē* 'hard' → *kata-me* 'quite hard'
4. *nagē* 'long' → *naga-meru* 'to lengthen/lie down' → *nagame* 'lengthening/lying down'

However, the category (3.) is overall quite rare and possibly unproductive in Hachijō, as I found no compelling occurrence after a monomoraic adjective or after a Sino-Japanese adjective. Still, one can note the striking structural similarity in synchrony between

²⁶ In which *me* is often said to have conflated with 見え *mié* 'appearance', the *ren'yōkei* of the OJ verb 見ゆ *miyu* 'to be visible' (modern *mieru* 見える). See Martin (1975: 830-831).

²⁷ For instance, *MYS*, XII, 2967 already has 縫目 *nupi-me*, OJ form of 縫い目 *nui-me*.

²⁸ For instance in *The Tale of Genji*, 26 (*Tōkonatsu*), 細目 *hoso-me* 'rather thin' (Murasaki 1927:259).

²⁹ References dictionaries such as the *Daigenkai* (Ōtsuki 1939: 568) and the *Dajiten* (Heibonsha 1935: 294) quote a first occurrence in a commentary of the *Shiki* dated from the Bunmei era (1469-1487).

the *-me* in standard Japanese *koi-me* ‘strongish’, and the *-me* in Hachijō *okkanake=me* ‘how scary’; both occurring after the adnominal form of an adjective.

Among all those forms and meanings, the ‘face’, ‘appearance’³⁰ one (7. in the list above) seems to be most plausible candidate for a grammaticalisation as a derogatory suffix, if one assumes that it was originally used in insults and subsequently reanalysed as a derogatory suffix³¹, e.g.:

- *aho* ‘fool’ → *aho-me* *‘idiot-face’ → (reanalysed) *aho* + *-me* ‘idiot-DER’

This derogatory meaning would then have been extended to express humility or self-contempt and would have been subsequently extended to talk with humility about one’s children. Finally, the suffix would have been reanalysed as a diminutive, allowing its extension probably first to cattle animals, then to all animals in some varieties:

- ‘face’ → contempt → self-contempt → endearment → animality

This hypothesis seems plausible, but it supposes that the ‘face’ meaning was lost quite early on, since it is not perceptible any more already in the first occurrences, especially the ones that follow a proper name. However, one problem with this hypothesis is that whereas the endearment meaning is already attested very early on (as shown in the example (12) from the *Soga Monogatari*), the self-contempt one is not very common at that time, and is totally absent from some varieties like Hachijō.

2.2. An origin as a directive / focus marker?

Another possibility is to consider that the derogatory meaning of *-me* is secondary and that it was originally a directive or a focus marker. As a matter of fact, as stated earlier, the suffix *-me* is attested after a deictic in a large number of older occurrences, and is said to be especially productive in this use in some varieties such as the Sendai dialect from Miyagi (Doi 1919: 76).

Besides, several Japanese dialects³² have an element *-me* that works as a directional marker, as in *oki-me* ‘off-shore’, *higashi-me* ‘to the east’, *nishi-me* ‘to the West’, and a homophonous adverb *me* seems to exist in at least some Ryukyuan languages³³. Thus, it is possible to suppose that a **me* deictic element (possibly originating from the meaning ‘target’, ‘goal’ of the root ‘eye’) was used in prehistoric Japanese with a meaning such as ‘there’, ‘over there’, and was reinterpreted as derogatory suffix because of its frequent use in apostrophe:

- **ano aho me* ‘that fool over there’ → (reanalysed) *ano aho-me* ‘that fool-DER’

While not completely implausible, this hypothesis remains quite speculative, since there is no proof that the directive element found in those varieties is ancient. Alternate-

³⁰ Not unlike like in English *-face* in *fatface*, *prickface*, *jerkface*; French *tête de ...*, etc.

³¹ Theoretically, the meaning ‘value’ could also be a potential candidate, as in:

aho ‘fool’ → *aho-me* *‘idiot-worth’ → (reanalysed as) *aho* + *-me* ‘idiot-DER’

However, this meaning is likely too recent and too limited to have played any role in this grammaticalisation.

³² Namely, Yamaguchi prefecture (Shigemoto 1937 [1976]: 71; Yamanaka 1967: 166), Tsushima island (Takiyama & Yanagita 1944: 94) and Kimotsuki-gun, Kagoshima prefecture (Nomura & Yanagita 1942: 75).

³³ For instance in Taketomi island (Yaeyama). See (Maeara et al. 2011: 1206).

ly, it could very well be a rebracketing of the approximative suffix found after adjective roots, since the *-me* in *taka-me* ‘high-ish’ or *hiku-me* ‘lowish’, is very easily reanalysable as a kind of a locative (‘on the high side’ → ‘facing up’, ‘on the low side’ → ‘facing down’), which could have led to its extension to direction names.

Quite in the same way, it is also possible to suppose that the original meaning of the derogatory *-me* was some kind of a focus particle, originally used for emphasis or contrast, not unlike English *very*. As a matter of fact, a *me* assertive particle (similar to standard ㇿ) is found in some Ryukyuan languages, such as Yaeyama Ishigaki (Miyagi 2003: 1116), and a focus particle *me*₂ is said to occur in one occurrence of Eastern Old Japanese:

- (31) 須流河乃柵良波 苦不志久米阿流可
 Suru^gga-no₂ ne₁-ra pa kupusi-ku=**me**₂ ar-u=ka
 Suruga=GEN cliff-PL=TOP be.longing-ADV=FOC be-RT=EMPH
 How I long / for the cliffs of Suruga... (MYS, XX, 4345, 4-5)

Besides, this hypothesis would work quite well with the oldest attestations of *-me*:

- *kono* [...] *yatsu-me* ‘that very fellow’
- *sono Nakatsuna-me* ‘that very Nakatsuna’
- *ano wappa-me* ‘that very child’

Then, this putative *-me* could have specialised as a humble 1st person marker meaning ‘me personally’ in a devoted way, and, since the focalisation after a deictic was often negative, it would have gradually become a derogative marker, leading to its specialisation in animal names:

- focus → contempt / self-contempt → animal

While this hypothesis is also not completely implausible and would explain the high frequency of *-me* with deictics, it is also very shallow. As a matter of fact, EOJ *mē* is a *hapax legomenon*, and might very well be a mere graphic variant of OJ *mo*₂ due to phonetic peculiarities of the Suruga OJ variety (see Kupchik 2023: 31-32). Besides, the assertive particle *me* in Ishigaki does not have the same semantic and syntactic properties as a focus particle, and is most likely unrelated to the derogatory *-me*.

2.3. An origin as a composition element?

In addition to all those homophonous roots³⁴, it has also been noted for a long time (for instance by Suzuki 1816: 1-2) that an element *-me* was also very common in bird names such as 雀 *suzume* ‘sparrow’, 鷗 *kamome* ‘seagull’ or 燕 *tsuba(kura)me* ‘swallow’, although it is usually not displayed in the spelling, all those birds having their own *kanji*. The same was also noted for fish names, in which this is even more common, for instance in 油女 *aburame* ‘fat greenling’, 泥目 *dorome* ‘gluttonous goby’ or 平目

³⁴ There is yet another homophonous root *me* (藻) meaning ‘seaweed’ (for instance in *waka-me* ‘edible brown seaweed’) which will not be discussed here since it is highly unlikely to have played a role in the emergence of the animal and human suffixes.

hirame ‘flounder’, in which the *-me* element is usually graphically visible and noted with a phonetic use of either <女> ‘woman’ or <目> ‘eye’.

Besides, it was noted as early as 1775 (Koshigaya 1775: 1), and more recently by Maeda (1988: 27-29) that those animal names ending in *-me* used to be even more common in Old and Middle Japanese, with such bird names as 小雀め *kogarame* ‘willow tit’ (now 小雀 *kogara*), 鶇鶇 *uyome* / *iyome* ‘grebe’ (now 鶇鶇), 機織め *hataorime* ‘weaverbird’ (now 機織鳥 *hataori-dori*), 山雀め *yamagaramame* ‘varied tit’ (now 山雀 *yamagara*); and fish names like 赤女 *akame*³⁵ ‘sea bream’ (now 鯛 *tai*) or 口女 *kuchime* ‘young striped mullet’ (now 鰯 *bora* or *nayoshi*). However, to the best of my knowledge, such an element *-me* does not seem attested in Ryūkyū bird and fish names.

This led several scholars to suppose that there were yet two other roots **-me* in Old Japanese or pre-Old Japanese, respectively meaning ‘bird’ and ‘fish’. Thus, several *koku-go* dictionaries, such as the *Daigenkai* (Ōtsuki 1939: 568) and the *Daijiten* (Heibonsha 1935: 294) came to treat those two ‘*me*’ elements as separate entries.

Remarkably, several of those animal names seem to be analysable as semantically and structurally sound compounds, namely:

- | | | |
|------------------------|--|-----------------------|
| – <i>suzu-me</i> | = ‘chirping sound ³⁶ + <i>-me</i> | = ‘chirping bird’ |
| – <i>tsuba-kura-me</i> | = ‘wing’ + ‘black’ + <i>-me</i> | = ‘black-winged bird’ |
| – <i>hataori-me</i> | = ‘weaving’ + <i>-me</i> | = ‘weaver bird’ |
| – <i>kogara-me</i> | = ‘small + tit ³⁷ + <i>-me</i> | = ‘small tit bird’ |
| – <i>yamagara-me</i> | = ‘mountain + tit’ + <i>-me</i> | = ‘wild tit bird’ |

And for fish:

- | | | |
|-------------------|---------------------------|---------------|
| – <i>abura-me</i> | = ‘oil, fat’ + <i>-me</i> | = ‘fat fish’ |
| – <i>doro-me</i> | = ‘mud’ + <i>-me</i> | = ‘mud fish’ |
| – <i>hira-me</i> | = ‘flat’ + <i>-me</i> | = ‘flat fish’ |
| – <i>aka-me</i> | = ‘red’ + <i>-me</i> | = ‘red fish’ |

The words *kamome* (OJ *kamame*), *uyome* and *kuchime* are more difficult to analyse, but it is not impossible that the first two are linked with other aquatic bird names (namely *kamo* ‘duck’ and *u* ‘cormorant’), while the second could be either a clipping of compound containing 口 *kuchi* ‘mouth’, or perhaps a compound with an unvoiced variant of the element *kuji-* found in 鯨 *kujira* ‘whale’ and 久慈目 *kujime* ‘spotbelly greenling’.

Remarkably, while those words are all seemingly analysable as compounds, *-me* does not seem to have the same semantic meaning in all of them. Namely, in the case of *kogara-me* and *yamagara-me* *-me* is semantically superfluous, since tits are birds by definition. Thus, in these two words, *-me* seems to be a facultative suffix, which may be acting like a categoriser. On the contrary, *-me* appears to be a necessary component conveying the [animal] meaning in the other words, especially in all fish names.

³⁵ The word 赤目 *akame* still exists in contemporary Japanese, but means ‘red mullet’, which is a visually quite similar but much less common fish.

³⁶ According to Suzuki (1816: 1). This hypothesis seems to be corroborated by the various dialect forms *chichi(-me)*, *chinchin(-me)*, *choncho(-me)*, etc.

³⁷ This root is not found in isolation, but seen in several compounds: *shijū-gara* ‘black tit’, *eboshi-gara* ‘tufted tit’, *hi-gara* ‘coal tit’, *hige-gara* ‘bearded tit’, etc.

In addition, it can be noted that several of those words frequently occur without *-me* in some varieties, especially in compounds, for instance³⁸:

- *tsubakura* / *tsubakuro* ‘swallow’ (common)
- *niwa-suzu* ‘garden sparrow’ (Chiba, Shimane)
- *shiro-gamo* / *shira-gamo* ‘white gull’ (Kumamoto, Shimane)
- *abura* ‘fat greenling’ (Kagawa)
- *de-bira* ‘flounder’ (Kagawa, Hiroshima, Ehime)

The fact that *-me* seems to be less common in compounds is a remarkable parallel with Hachijō. Besides, it is interesting to note that, if the analysis of *-me* as an element of composition is correct, the modern form *tsubame* ‘swallow’ is most likely the result of a clipping of *tsuba-kura-me*, since ‘winged bird’ is by no means a specific bird name.

Based on all these elements, it was theorised by several scholars (such as Tachibana 1933: 35-36; Kindaichi 1973: 172) that the *-me* element in birds and fish names was likely to be a word meaning ‘animal’ that was used as a suffix or an element of composition, and was gradually lost and lexicalized in standard Japanese, but was preserved in more conservative varieties as a facultative suffix.

In this case, the derogatory meaning would be secondary, and due to a pejorative comparison of the suffixed word with animals, namely:

- ‘animal’ → contempt → self-contempt

This hypothesis seems perhaps more plausible than the preceding ones. However, it is also quite speculative, given the fact that occurrences of the derogatory suffix *-me* precede the occurrences of the animal *-me*. Besides, one could still wonder about the origin of this putative animal marker **me*.

2.4. An origin as a collective marker?

In this regard, a hypothesis was already well established in the Edo period (Suzuki 1814: 2), claiming that the *-me* that is found in animal names was originally a collective suffix 群れ *-mure* ‘flock’. In this case, *-me* could be cognate with the Ryukyuan plural suffix *-buri* / *-mmi* (Shimoji 2022: 506), with *Taketomi -me* (Maeara et al. 2011: 1206), and with a plural *-me* found in a few Kyūshū topolects such as Kuboizumi:

- (32) koton-**ME**=nya kimon tsukut-te
 child-**PL**=DAT.TOP clothes prepare-CONJ
 Preparing clothes for the children... (Kindaichi & Shibata 1966: 126)

More precisely, the meaning ‘flock’ would have been used for animals as a collective, and for humans as a derogatory plural (as in English ‘bunch of’), leading to its split into two suffixes:

- ‘flock’ → human plural → contempt → self-contempt → endearment → animal plural → animality

³⁸ All forms are quoted from the *Nihongo hōgen daijiten* (Shōgakukan 2003).

This hypothesis has several qualities. First of all, it is quite satisfactory in explaining with one form the origin of the two suffixes. Besides, it would make sense for gulls, sparrows and swallows (which most often move in flocks) to be referred to as a collective, which is the case in all occurrences of those words in the *Man'yōshū*. However, the shift **-mure* > **-me* would require a rather irregular phonetic development quite early on in the history of the language, and would therefore need further research in order to be confirmed or infirmed.

2.5. An origin as a diminutive?

Finally, there is one last hypothesis which might be worth considering, namely that the original meaning of *-me* in Japanese varieties was a diminutive marker. As a matter of fact, as shown for instance by Jurafsky (1996), diminutives can come to express a variety of meanings beside smallness, among which endearment or familiarity, contempt, humility, specification and approximation, all meanings that, as we saw, can be expressed by the different *-me* suffixes in Japonic varieties. This can also be seen in Japonic for instance with the different meanings of Miyako diminutive *-gama*³⁹:

- (33) ba=ga ffa-gama=a kanasī-munu
 I=GEN child-DIM=TOP lovely-thing
 ‘My little child is lovely’ (Michinori 2008: 247)

- (34) uma=nu junsja-gama
 MED=GEN policeman-DIM
 ‘That *bloody* policeman there...’ (Michinori 2008: 247)

Besides, Antonov (2007: 195-198) showed that the diminutive *-ra* in Old Japanese was also linked with the expression of plural and locative, and Pellard (2010: 140) indicated that the diminutive in Ōgami was also frequently used with deictics in order to indicate ‘imprecise direction’, which could explain several of the specific uses that were discussed in the above.

In addition, as noted by Jurafsky (1996: 568), diminutives are also especially common in animal names, and can very easily get lexicalized. Thus, we can assume that the fossilised animal names in *-me* are lexical traces of a former diminutive suffix that was only preserved in some varieties, and which was specialised in standard Japanese as a derogatory suffix when following a noun, and (possibly) as an approximation suffix when following an adjective. A good argument in favour of this hypothesis could be the existence of a diminutive *-be* in some eastern varieties (already noted by Morishita 1981: 176-178), which could easily be a cognate of *-me*, as well as the existence of several dialect forms in which *-me* is replaced by the more common diminutive suffix *-ko*, as in⁴⁰:

³⁹ As shown by Jarosz (2015), there is at least one lexicalized bird name in *-gama*: *ssumi-gama* ‘white-eye’.

⁴⁰ All forms are quoted from the *Nihongo hōgen daijiten* (Shōgakukan 2003).

- *tsuba-me* 'swallow' (standard) = *tsunba-ko* (Chiba)
- *suzu-me* 'sparrow' (standard) = *chichi-nko* (Ōita)
- *abura-me* 'fat greenling' (standard) = *abura-ko* (Yamagata)
- *yama-me* 'masu trout' (standard) = *yama-nko* (Hyōgo)
- *dō-me* 'round herring' (Hyōgo, Tottori, Shimane) = *don-ko* (Ishikawa)

Similarly, it can be noted that the Hachijō of Japanese *kamome*, *kabuna(-me)* exhibits the Eastern Old Japanese diminutive *-na*.

In this case, there is still to explain the origin of such a diminutive. In this perspective, a good candidate would probably be the homophonous root *mé*⁴¹ < Old Japanese *me*₁ (< PJ *mya), meaning 'woman' (女), 'female' (雌), as already suggested by Nakamoto (1980: 100) and Martin (1975: 831). As a matter of fact, as shown again by Jurafsky (1996: 536), the concept of 'girl' is frequently associated with smallness or youth, especially in Japan⁴¹. For instance, it can be observed already in Old Japanese that *me* serves as a diminutive prefix, for instance in 女滝 *me-daki* 'small waterfall' (lit. 'girl waterfall'), vs 雄滝 *wo-daki* 'large waterfall' (lit. 'boy waterfall'), or 女波 *me-nami* 'small wave' (lit. 'girl wave'), vs 男波 *wo-nami* 'large wave' (lit. 'boy wave').

In compounds, *-me* also regularly occurs in parallel with *-ko* 'child' in Old Japanese:

- *oto-me* 'girl' vs *oto-ko* 'boy'
- *musu-me* 'daughter' vs *musu-ko* 'son'
- *iratsu-me* 'lass', vs. *iratsu-ko* 'lad'
- *hi-me* 'princess' vs *hi-ko* 'son'

Given the fact that *-ko* grammaticalised as a diminutive suffix in many Japanese varieties, it is not implausible to suppose that *-me* underwent the same grammaticalisation as *ko* (either by parallel development or as the result of a chain shift), but specialised in animal meanings or derogatory diminutive due to usually inferior position of women in the traditional Japanese society⁴². Besides, given the fact that *-ko* often marks an inanimate diminutive (as in *furi-ko* 'pendulum', *hashi-go* 'ladder'⁴³), it is also not impossible that *-me* specialised early on as an *animate* diminutive, which would have made it specialisation in animal names even easier.

If this hypothesis is correct, *-me* would be comparable with the English suffix *-ster*, which was originally feminine in meaning, got fossilized in a few animal names (such as *lobster*), and went on to become a derogative agent suffix, for instance in *gangster*, *scamster*, *prankster* etc.:

- 'woman' → (animate) diminutive → animality
- endearment
- contempt / self-contempt

⁴¹ For example, the Yamagata hōgen kenkyū-kai (1970: 603) relates that the word *me* (etymologically 'female') now fully means 'child' in this variety.

⁴² If one needs examples of the perception of women in ancient East Asia, one can for instance observe that the *kanji* radical <女> is also often pejorative, for instance in compounds such as <媼> 'quarrel' or <姦> 'wicked'.

⁴³ Compare the Chinese suffix <子> *-zi* for a similar phenomenon.

This hypothesis is, in my opinion, the most economic one, since it manages to bring back almost all meanings of *-me* to one single original meaning. However, it does remain quite shallow, given the fact that this putative diminutive does not occur in Old Japanese. Thus, at this stage, more research is needed in order to confirm or infirm this hypothesis.

Conclusion

In this article, we have showed that several Japanese dialects, and especially the variety of Hachijō exhibit a peculiar suffix *-me*, which raises a lot of questions, both synchronically and diachronically.

Synchronically, three main uses of *-me* can be distinguished in Hachijō:

1. a generic animal suffix, which looks quite lexicalized,
2. a less bound diminutive suffix, that is specialised in kinship terms and insults,
3. a nominalising element that lacks any clear semantic value,

However, it seems plausible that all of those elements share the same origin.

Finally, I have showed that there are several possible scenarios in order to explain the origin of these suffixes, namely:

1. ‘face’ → contempt → self-contempt → diminutive → animality
2. *focus → contempt / self-contempt → animality
3. *‘animal’ → contempt → self-contempt
4. ‘flock’ → human plural → contempt → self-contempt → endearment
→ animal plural → animality
5. ‘woman’ → diminutive → animality
→ endearment
→ contempt / self-contempt

At this stage, more research is needed in order to disentangle these possibilities. Especially, more historical evidence from Old and Middle Japanese will have to be considered for further research, as well as more comparative evidence from other Japonic varieties.

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Central Chadic numerals in comparative perspective

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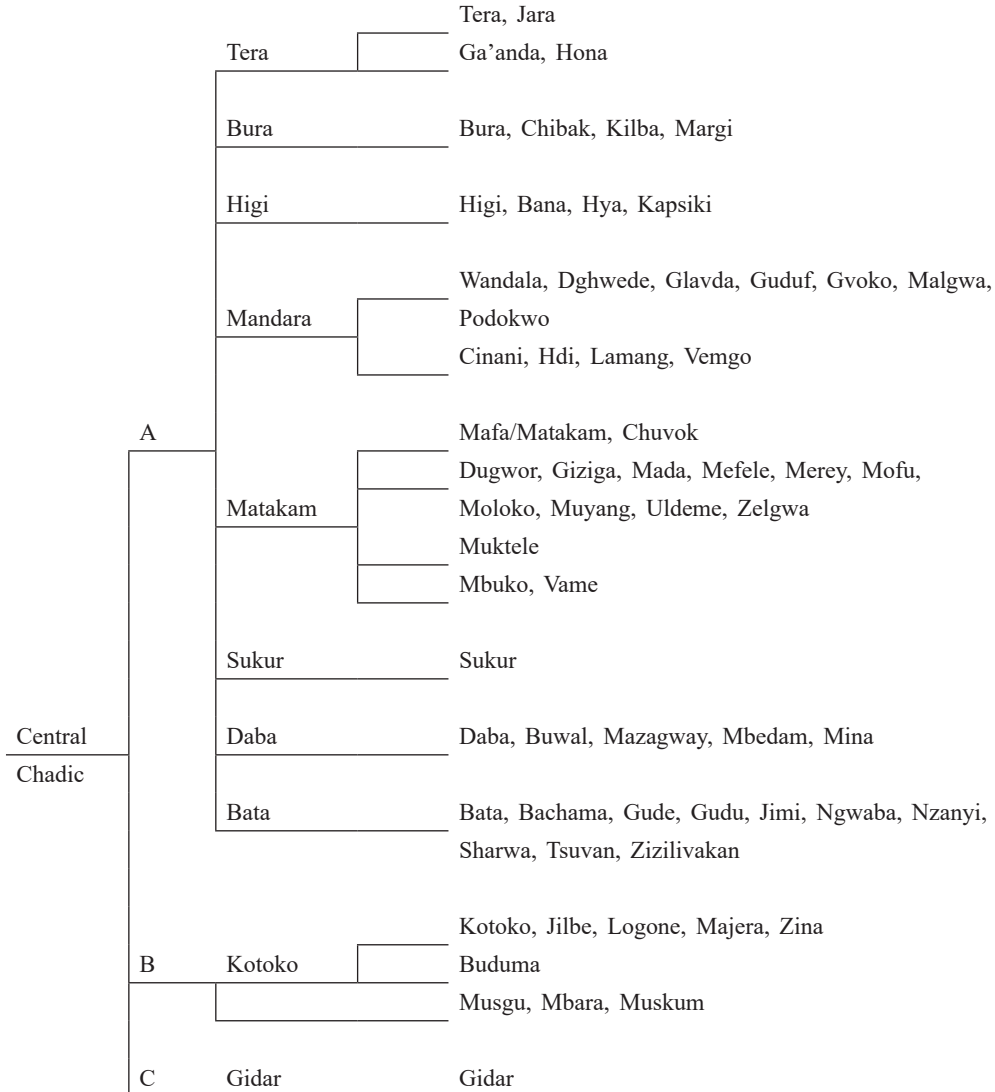
Abstract: The present study summarizes the forms of numerals of the first decade in more than 200 Central Chadic languages and their varieties, including their sources, to analyze their internal structure and external relations, in both genetic and areal plans.

Keywords: Central Chadic, numerals, internal structure, external relations, etymology

The contribution concentrates on the basic numerals of the first decade in the Central branch of the Chadic language family of the Afroasiatic macrofamily. It was preceded by two studies devoted to West Chadic and East Chadic numerals (Blažek 2018; 2021). The first task is the documentation of all relevant sources, i.e. both the most recent records in scientific transcriptions and historical records of the first travellers from all described languages. The second task is the analysis of their internal structure, verified in their external comparison with corresponding forms in other Chadic languages and finally the identification of prospective cognates in other Afroasiatic branches or areal parallels in neighboring Niger-Congo or Nilo-Saharan languages. The results are confronted with the most recent variants of classifications of the Central Chadic branch by Barreteau & Jungraithmayr (1993), Starostin (2010), Newman (2013), and Gravina (2011; 2014).

1. Classification of the Central Chadic branch

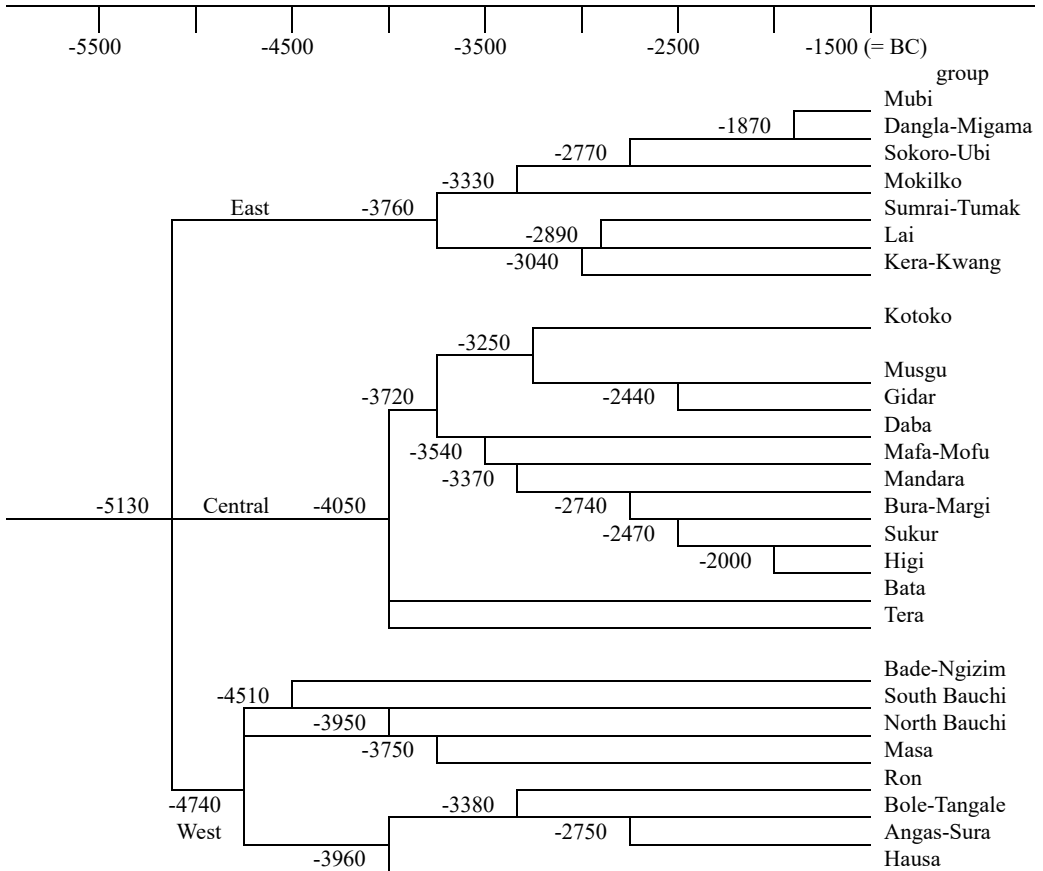
1.1. The model of classification of the Chadic languages of Paul Newman (2013) is already classical:



1.2. Richard Gravina (2011: 67-84; 2014: 26-27) limits his research only to the Central Chadic (= Biu-Mandara) branch of the Chadic family. His model is based on his careful analysis of historical phonetics and its changes in perspective of relative chronology. The result is significantly different from the traditional model of Paul Newman:

		Mafa	Mafa, Mefele, Cuvok
		Sukur	Sukur
		Daba	Daba, Mazagway Hidi
		Mina	Mina, Mbudum
		Buwal	Buwal, Gavar
		Bata	Bachama, Bata, Fali, Gude, Gudu, Holma, Jimi, Ngwaba, Nzanyi, Sharwa
		Tsuvan	Tsuvan, Zizilivakan
		Tera	Boga, Ga'anda, Hwana
		Hurza	Vame, Mbuko
		Margi	Bura, Cibak, Kofa, Putai, Nggwahyi
		Margi	Kilba, Margi, South Margi
		Mandara	Wandala, Mandara, (Malgwa)
		Glavda	Cinani, Dghwede, Guduf,
		Podoko	Gava, Glavda, Gvoko
		Tokomberi	Podokwo, Matal
		Mofu	Uldeme, Mada, Muyang, Moloko
		Meri	Zelgwa, (Gemzek), Merey, Dogwor
		Mofu	North Mofu, Mofu-Gudur
		Higi	Bana, Hya, Psikye, Kamwe
		Lamang	Lamang, Hdi, Mabas
		Marwa	Giziga N+S, Mbazla
		Gidar	Gidar
		Musgum	Mbara, Musgum, Muskum
		North Kotoko	Mpade, Afade, Malgbe,
		Island Kotoko	Maltam
		Central Kotoko	Buduma
		South Kotoko	Lagwan, Mser
			Zina, Mazera
Central Chadic	South		
	North		
	Margi-Mandara-Mofu		

1.4. Another tree-diagram based on the glottochronological test was realized by George Starostin (ms. 2010) for the whole Chadic family. Rather surprising is his inclusion of the group Masa in the West branch, together with North Bauchi.



2. Survey of the Central Chadic numerals

2.1. Tera

Language	1	2	3	4	5
Tera _{1/2}	dà / da	rāp / rab	kúnúŋ / kunuk	vàt / fad	qúr̀m̀n / gúr̀mun
Tera ₃	dà	rap	kúmú	vàt	gúr̀m̀n
Pidlimdi	ərdə̀	rap	màkìn	və̀dì	gurmun

Ga'anda	<i>aŕta</i>	<i>suŕŕi</i>	<i>makkən</i>	<i>fwədā</i>	<i>dŕrmən</i>
Boka	<i>ŕtā</i>	<i>cəp</i>	<i>məkkən</i>	<i>fwədā</i>	<i>dŕrmən</i>
Gabın	<i>hərtā</i>	<i>sŕri</i>	<i>maxkən</i>	<i>fwədə</i>	<i>dŕrmən</i>
Hwona	<i>tital</i>	<i>suyuri</i>	<i>maxən</i>	<i>fadā</i>	<i>tuf(ù)</i>
PTera PHwona	⁺ <i>hiʔarda</i> ⁺ <i>tital</i>	⁺ <i>rap</i> [*] <i>sŕri</i>	⁺ <i>kunu</i> [*] <i>mahkan</i>	[*] <i>fod</i> = ⁺ <i>fʷad</i>	[*] <i>dŕrman</i> ⁺ <i>tijʷ</i>

Language	6	7	8	9	10
Tera _{1/2}	<i>nʔəŋ / njoŋ</i>	<i>mút / mut</i>	<i>mīāsī / mīyasi</i>	<i>mīʒām / milam</i>	<i>gʷāŋ / gwan</i>
Tera ₃	<i>nʔəŋ</i>	<i>mut</i>	<i>mīyasi</i>	<i>məʒam</i>	<i>gʷāŋ</i>
Pidlimdi	<i>šəŋ</i>	<i>mùdī</i>	<i>mīyérzi</i>	<i>mīðam</i>	<i>bʷāŋ</i>
Ga'anda	<i>mıca</i>	<i>mwùt(n)</i>	<i>fwətfwədā</i>	<i>wənhəhəʔaŕtā</i>	<i>kum</i>
Boka	<i>tyèxxeł</i>	<i>mwut</i>	<i>fwotfwədā</i>	<i>həhirta</i>	<i>kum</i>
Gabın	<i>mıçè</i>	<i>mwòt</i>	<i>fwətfwədā</i>	<i>fendŕrmən</i>	<i>kùm</i>
Hwona	<i>miki</i>	<i>mid(u)</i>	<i>(w)ı̀nwədā</i>	<i>wùtərə</i>	<i>gumdidī / kum</i>
PTera PHwona	⁺ <i>ŋyoŋ</i> ⁺ <i>miki</i>	[*] <i>mud</i> = ⁺ <i>midu</i>	⁺ <i>mīyasiri</i> ⁺ <i>fʷadfʷad</i>	⁺ <i>mīʒam</i> ⁺ <i>gʷaŋ-ha-hiʔarda</i> ⁺ <i>fʷad dŕrman</i>	⁺ <i>gʷaŋ</i> [*] <i>kʷim</i>

Boka = Boga numerals by Charles H. Kraft <https://mpi-lingweb.shh.mpg.de/numeral/Boga.htm>

Ga'anda numerals by Charles H. Kraft 2007 <https://mpi-lingweb.shh.mpg.de/numeral/Gaanda.htm>

Gabın numerals by Charles H. Kraft (1981, II: 33)

Hwona numerals by Charles H. Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Hwana.htm>

Pidlimdi numerals by Charles H. Kraft (1981, II: 4)

Tera_{1/2} numerals by Babayo Madi (2014) / Dr. Musa (1995) <https://mpi-lingweb.shh.mpg.de/numeral/Tera.htm>

Tera₃ numerals by Paul Newman (1964: 36).

2.2. Bura – Margi

Language	1	2	3	4	5
Bura ₁	<i>ntang</i>	<i>suda</i>	<i>makər</i>	<i>ŋfwar</i>	<i>ntufu</i>
Bura ₂	<i>ntəŋ</i>	<i>sūdā</i>	<i>mākər</i>	<i>ŋfwar</i>	<i>ntəfū</i>
Bura-Pabir _{1/2}	<i>ntàng / ntəŋ</i>	<i>sūdā / sudā</i>	<i>mākər/makũr</i>	<i>fʷər/fʷar</i>	<i>ntifū / ntufū</i>
Chibak	<i>təŋ / patù / dukù</i>	<i>sudcè</i>	<i>makũr</i>	<i>fʷòdù</i>	<i>tufū</i>
Ngwaxi ₁	<i>təŋ</i>	<i>sūdā</i>	<i>makũr</i>	<i>fʷər</i>	<i>tufū</i>
West Margi	<i>duku / təŋ / dugu</i>	<i>sūdā / fidè</i>	<i>makür</i>	<i>fòdù/fwodù</i>	<i>tufū</i>
Central Margi	<i>təŋ / patu / titikù</i>	<i>mīlù / sūdāŋ</i>	<i>makũr</i>	<i>fʷodù</i>	<i>ntifū</i>

South Margi	<i>tà'ú, zə̀mù, páthlú</i>	<i>sə̀dà'ú / móthlú</i>	<i>màkə̀r</i>	<i>fwádú/ fódú</i>	<i>táffú</i>
Hildi	<i>zə̀yuw / tàyu</i>	<i>míłú / sídáyú</i>	<i>mákrù/makùr(ù)</i>	<i>fwə̀dú</i>	<i>tufú</i>
Wamdiu Margi	<i>zìmu/tə̀yupatu</i>	<i>mitu</i>	<i>makiru</i>	<i>fodú</i>	<i>tufu</i>
Kilba ₁	<i>dzàŋ</i>	<i>mə̀tlù</i>	<i>màkə̀r/màkə̀rù</i>	<i>fòdù</i>	<i>tùfù</i>
Kilba ₂	<i>žáànyú</i>	<i>méłú</i>	<i>mákrù</i>	<i>fòdù</i>	<i>tùfù</i>
*	<i>+taj / +tiku / +duku / +dzaŋaw / +patu</i>	<i>*suda = +sídaway +mitu</i>	<i>*maakir = +maakiru</i>	<i>*fʷadu</i>	<i>*tɪfʷ</i>

Language	6	7	8	9	10
Bura ₁	<i>nkwa</i>	<i>murfa</i>	<i>ncisu</i>	<i>umdlá</i>	<i>kum(a)</i>
Bura ₂	<i>nkwà</i>	<i>murfà</i>	<i>ncisù</i>	<i>umdlà</i>	<i>kuma</i>
Bura-Pabir _{1/2}	<i>nkwà / ŋkwà</i>	<i>mùrfà / murfà</i>	<i>cisù / ncisù</i>	<i>ùmòlà / mòdà</i>	<i>kùmà / kuma</i>
Chibak	<i>ŋkwà</i>	<i>murifwè</i>	<i>ntsisù</i>	<i>miðæ</i>	<i>kuma</i>
Ngwaxi _{1/2}	<i>nkwə̀</i>	<i>muřfà</i>	<i>ncis / ncis miðà</i>	<i>miðà / miðà</i>	<i>kuma</i>
West Marghi	<i>kwa / kwə̀</i>	<i>mudífā / mudífē</i>	<i>cisù / ncisù</i>	<i>mòdà / mòè</i>	<i>kuma / kume</i>
Central Marghi	<i>ŋkwà</i>	<i>midífú</i>	<i>ntsisù</i>	<i>mòdù</i>	<i>kumu</i>
South Margi	<i>kwà</i>	<i>mədə̀fàù</i>	<i>císsù</i>	<i>ə̀ldlàu</i>	<i>kùmòù</i>
Hildi	<i>kwà</i>	<i>mídífē</i>	<i>císù</i>	<i>ðə̀w</i>	<i>kúmə̀</i>
Wamdiu Margi	<i>kwà</i>	<i>midífə̀w</i>	<i>cisù</i>	<i>idə̀w</i>	<i>kumə̀</i>
Kilba ₁	<i>kwà</i>	<i>mədə̀fà</i>	<i>cisù</i>	<i>dlà</i>	<i>kùmà / kum</i>
Kilba ₂	<i>kwà</i>	<i>mēdfà</i>	<i>čísù</i>	<i>ðà</i>	<i>kùmà</i>
*	<i>*kʷa = +ŋkʷa</i>	<i>*midífaw</i>	<i>*tsʷisʷ</i>	<i>+miłzaw</i>	<i>*kʷima</i>

Bura₁ by Roger Blench (2010).

Bura₂ numerals by Russell G. Schuh with Elisha Shalanguwa (1981-82).

Bura-Pabir_{1/2} numerals by Mohammed Aminu Muazu and Mr. Fibi Balami (2010) / Charles H. Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Bura.htm>

Central Marghi numerals by Charles H. Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Marghi-Central.htm>

Chibak = Kibaku numerals by Charles H. Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Cibak.htm>

Hildi numerals by Charles H. Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/South%20Marghi.html>

Kilba₁ = Huba numerals by Mohammed Aminu Muazu (2010)

<https://mpi-lingweb.shh.mpg.de/numeral/Huba-Kilba.htm>

Kilba₂ numerals by Charles H. Kraft (1981, II: 92)

Ngwaxi₁ = Nggwahyi numerals by Charles H. Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Nggwahyi.htm>

Ngwaxi₂ = Nggwahyi numerals by Charles H. Kraft (1981, II: 82)

South Marghi numerals by Charles H. Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/South%20Marghi.html>

Wamdiu Margi numerals by Charles H. Kraft (1981, II: 112)

West Margi = Putai numerals by Charles H. Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Putai.htm>

2.3. Bana

Llanguage	1	2	3	4	5
Bana _{1/2}	<i>tánə / kwətiŋ</i>	<i>bákə / bakə</i>	<i>máhəkánə / mahkan</i>	<i>fúdə / fadə</i>	<i>cifə / cifə</i>
Fali Kiria ₁	<i>gutàn / tanəy</i>	<i>bwuku?</i>	<i>màkun(u)</i>	<i>fwadũ?</i>	<i>(w)cifũ?</i>
Fali Kiria ₂	<i>gùtàn</i>	<i>bàkə̀</i>	<i>makən</i>	<i>fwàdè / fwàr</i>	<i>ncifə</i>
Baza	<i>gutá</i>	<i>bagé</i>	<i>makená</i>	<i>fōra</i>	<i>jufa</i>
Fali Wuba	<i>tan</i>	<i>baka</i>	<i>makin</i>	<i>nfwor</i>	<i>ncifa</i>
Fali Gili	<i>kwùtyin / taŋ</i>	<i>bak</i>	<i>màxkan</i>	<i>fwad</i>	<i>cif</i>
Fali Mucella	<i>tèn, ʔaĩmə</i>	<i>bek / buk</i>	<i>màxk(u)</i>	<i>fwəd</i>	<i>tuf</i>
Fali ɓwagira	<i>tân</i>	<i>buk</i>	<i>màxk(un)</i>	<i>fwat</i>	<i>tuf</i>
Higi Ghye	<i>paðe / tanɛ</i>	<i>bage</i>	<i>màŋke</i>	<i>fwadɛ</i>	<i>wcivi</i>
Kapsiki ₁	<i>kwetɛŋe</i>	<i>bake</i>	<i>mahekene</i>	<i>wəfadɛ</i>	<i>mcefe</i>
Kapsiki ₂	<i>kwàténé</i>	<i>báká</i>	<i>màRkən</i>	<i>wəfádá</i>	<i>ùcəʔə́</i>
Kapsiki ₃	<i>kōtán</i>	<i>bāk</i>	<i>māchkén</i>	<i>ōfāt</i>	<i>nschäf</i>
Hidji	<i>kūté</i>	<i>bāgé</i>	<i>mākéné</i>	<i>foāré</i>	<i>tschifé</i>
Higi Kamale	<i>tanɛ, kùtanɛ</i>	<i>bake</i>	<i>màxkune</i>	<i>fwadɛ</i>	<i>mcufwe</i>
Higi Nkafa	<i>palɛ / kùte</i>	<i>ɓwàge</i>	<i>màkine</i>	<i>fwàre</i>	<i>ncife</i>
Higi Baza	<i>paləw</i>	<i>ɓwògu</i>	<i>màkə</i>	<i>fwó</i>	<i>mcife</i>
Higi Futu	<i>tixuy</i>	<i>ɓaxu / baku</i>	<i>màku</i>	<i>fwadũ</i>	<i>mcef / mcəf(i)</i>
Fali Jilbu	<i>lm</i>	<i>sul</i>	<i>màxku</i>	<i>fwəy</i>	<i>mùxtyup</i>
Zizilivakan	<i>lm</i>	<i>sul</i>	<i>màxku</i>	<i>fwəy</i>	<i>mùxtyup</i>
*	<i>+tix / +tanay / +palaw / +lim</i>	<i>*ɓiwak = +ɓiwaku / +sul</i>	<i>*maxkin</i>	<i>*wifadĩ = +fwadĩ</i>	<i>*wits'ifi +mits'ifi</i>

Language	6	7	8	9	10
Bana _{1/2}	<i>kwáŋ / kwaŋ</i>	<i>bərfàŋ / mbərfəŋ</i>	<i>dəyəsə / dəghəs</i>	<i>məlisədə / məslid'</i>	<i>məŋ / məŋ</i>
Fali Kiria ₁	<i>ŋkwaŋ</i>	<i>mbùrùfũŋ</i>	<i>tùgùsù?</i>	<i>ŋwlti(ʔyi)</i>	<i>gwùm(ù)</i>
Fali Kiria ₂	<i>kwáng</i>	<i>mbùrfəŋg</i>	<i>təghàs</i>	<i>wɾi</i>	<i>gùm</i>
Baza	<i>kwānge</i>	<i>brfunga</i>	<i>tikisa</i>	<i>thi</i>	<i>mūnge</i>
Fali Wuba	<i>nkwaŋ</i>	<i>birfũŋ</i>	<i>tixis</i>	<i>mti</i>	<i>gum</i>
Fali Gili	<i>kwəŋ</i>	<i>mbùrùfũŋ</i>	<i>dùgùs</i>	<i>miltut</i>	<i>mùŋ</i>
Fali Mucella	<i>yidəw < PFali *yidə</i>	<i>mbùrfũŋ</i>	<i>tùgus</i>	<i>miðŋ</i>	<i>gùm</i>
Fali ɓwagira	<i>mbùrùfũŋ kuwà</i>	<i>midũf</i>	<i>tùgus</i>	<i>miðŋ</i>	<i>po gumu</i>
Higi Ghye	<i>kwaŋəy</i>	<i>mbùrũfəŋəy</i>	<i>tùgùzi</i>	<i>wilti</i>	<i>mùŋəy</i>

Kapsiki ₁	<i>ɲkwaŋe</i>	<i>mberefaŋe</i>	<i>deghese</i>	<i>mesli</i>	<i>meŋe</i>
Kapsiki ₂	<i>ùŋkwájá</i>	<i>mbràfájá</i>	<i>dɔ̀ássá</i>	<i>mìcì</i>	<i>màŋá</i>
Kapsiki ₃	<i>nkōng</i>	<i>būrǎn</i>	<i>děrss</i>	<i>michtí / miltí</i>	<i>mǎng</i>
Hidji	<i>nkōá</i>	<i>mběrfúngě</i>	<i>těgěssé</i>	<i>tíí</i>	<i>měngé</i>
Higi Kamale	<i>ɲkwaŋəy</i>	<i>mbùrúfaŋəy</i>	<i>də̀gə̀se</i>	<i>mìlti</i>	<i>mùŋe</i>
Higi Nkafa	<i>kwaŋəy</i>	<i>mbùrfuŋəy</i>	<i>tíkise</i>	<i>pltiyi</i>	<i>mùŋəy</i>
Higi Baza	<i>kwa</i>	<i>màlúfá</i>	<i>tà̀gə̀sə</i>	<i>plti</i>	<i>mùŋə</i>
Higi Futu	<i>kwaŋ(u)</i>	<i>mbùrfəŋ(u)</i>	<i>díyusu</i>	<i>pltiyi</i>	<i>mùŋi</i>
Fali Jilbu	<i>ɲkwa?</i>	<i>mbùrfiŋ</i>	<i>tə̀yis</i>	<i>mìdì</i>	<i>gumù</i>
Zizilivakan	<i>ɲkwa?</i>	<i>mbùrfiŋ</i>	<i>tə̀yis</i>	<i>mìdì</i>	<i>gumù</i>
*	<i>*kʷaŋ = *ɲkʷaŋ</i>	<i>*mbùrfiŋ</i>	<i>*tə̀yis</i>	<i>*mìʒi</i>	<i>*gʷim</i>

Bana_{1/2} numerals by Ndokobaï (2009 / Zra Simon and Robert Hedinger (1994

<https://mpi-lingweb.shh.mpg.de/numeral/Bana.htm>

Baza numerals by Johannes Lukas (1937: 113).

Fali ɓwagira numerals by Charles Kraft (1981, III: 26).

Fali Kiria₁ = Kwame numerals by Charles H. Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Kwame.htm>

Fali Kiria₂ numerals by Roger Blench

<http://www.rogerblench.info/Language/Afroasiatic/Chadic/Central/Bura/Bura%20opening%20page.htm>

Fali Gili numerals by Charles Kraft (1981, II: 191).

Fali Jilbu = Zizilivakan numerals by Charles Kraft (1981, III: 6).

Fali Mucella numerals by Charles Kraft (1981, III: 16).

Fali Wuba numerals by Johannes Lukas (1937: 113).

Hidji numerals by Hauptmann Strümpell (1923: 120-23).

Higi Baza numerals by Charles Kraft (1981, II: 141).

Higi Futu numerals by Charles Kraft (1981, II: 171).

Higi Ghye = Hya numerals by Charles H. Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Hya.htm>

Higi Kamale numerals by Charles Kraft (1981, II: 151).

Higi Nkafa numerals by Charles Kraft (1981, II: 131).

Kapsiki₁ = Psikye numerals by Hubert Nkoumou (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Psikye.htm>

Kapsiki₂ numerals by Véronique de Colombel (letter from the Oct 20, 1987).

Kapsiki₃ numerals by Hauptmann Strümpell (1923, 120-23).

Zizilivakan numerals by Charles H. Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Zizilivakan.htm>

2.4. Lamang – Mandara

Language	1	2	3	4	5
Lamang	<i>tíuwá / tálá</i>	<i>χésá</i>	<i>χkə́ná</i>	<i>úfádá</i>	<i>χnítáfá</i>
Alataghwa	<i>tala</i>	<i>xasha</i>	<i>xəkɲa</i>	<i>úfada</i>	<i>xutáfa</i>
Turu	<i>teku, nden</i>	<i>xes, ghis</i>	<i>xakn</i>	<i>ufat</i>	<i>xutaf</i>
Vemgo/Vizik	<i>ndiŋ, tala</i>	<i>xres</i>	<i>xkɪn</i>	<i>ufat</i>	<i>xtaf</i>
Vemgo-Mabas	<i>pál / tékw</i>	<i>hés</i>	<i>xəkən</i>	<i>úfád</i>	<i>xútáf</i>
Gvoko	<i>palò / tekò</i>	<i>xecò</i>	<i>xəkʷarò</i>	<i>fwadò</i>	<i>ɣaʔò</i>
Hdi	<i>tèkw</i>	<i>his</i>	<i>həkən</i>	<i>fwád</i>	<i>hútáf</i>

Hidi	<i>tàrtúk</i>	<i>Rís</i>	<i>Ràkán</i>	<i>fǿwád</i>	<i>kàtáf</i>
Dghwede	<i>titíkwi, tekwè</i>	<i>micè</i>	<i>xəkùrè</i>	<i>fidí</i>	<i>ðibi</i>
Gava	<i>cək/kyek, kitək̀wùl̀à</i>	<i>mits(à)</i>	<i>xìkuřd(à), x̀kuř</i>	<i>ʔifəd(à)</i>	<i>ðib(à)</i>
Guduf-Gava	<i>tekʷè / kitakʷè</i>	<i>mitsè</i>	<i>xəkərdè</i>	<i>ufədè</i>	<i>ʔzibè</i>
Cinene	<i>pàl̀à</i>	<i>bùʷà</i>	<i>xəkərdà</i>	<i>ufādà</i>	<i>ʔzibà</i>
Glavda ₁	<i>páll</i>	<i>bwa</i>	<i>xkərd</i>	<i>ufád</i>	<i>ʔzəb</i>
Glavda ₂	<i>pala, kika</i>	<i>bowà</i>	<i>x̀kərdà</i>	<i>ʔufadà</i>	<i>ðibà</i>
Glavda ₃	<i>pàllà, cika</i>	<i>bù(a)</i>	<i>xkərdà</i>	<i>ufád(a)</i>	<i>dləbà</i>
Nakatsa	<i>pala</i>	<i>buwa</i>	<i>xakarda</i>	<i>wəfada</i>	<i>liba</i>
Mora	<i>pállé</i>	<i>bəwà</i>	<i>kəďəyà</i>	<i>ufādè</i>	<i>ʔzibè</i>
Wandala ₁	<i>pàlle</i>	<i>búwa</i>	<i>kəgyé</i>	<i>ufadè</i>	<i>ʔzəbè</i>
Wandala ₂	<i>pəle</i>	<i>(m)bùwà</i>	<i>kígye</i>	<i>ʔufwàde</i>	<i>ʔðibè</i>
Wandala ₃	<i>pāl̀é</i>	<i>büè</i>	<i>kīdè</i>	<i>əfádè</i>	<i>ʔildebe</i>
Wandala ₄	<i>pàlle</i>	<i>bwa</i>	<i>kəjə</i>	<i>ufade</i>	<i>ildebe</i>
Wandala ₅	<i>palle</i>	<i>búā</i>	<i>keyè</i>	<i>ufadè</i>	<i>ildebè</i>
Wandala ₆	<i>mtákwé</i>	<i>bùà</i>	<i>ki'jé</i>	<i>ufádè</i>	<i>ʔzèbè</i>
Wandala ₇	<i>mtaqué</i>	<i>sardah</i>	<i>kighah</i>	<i>fuddah</i>	<i>eliba</i>
Podokwo ₁	<i>kutəra</i>	<i>səra</i>	<i>makəra</i>	<i>ufada</i>	<i>zlama</i>
Podokwo ₂	<i>boktera</i>	<i>ezero</i>	<i>makera</i>	<i>ofada</i>	<i>zama</i>
Podokwo ₃	<i>kwātrá</i>	<i>sərà</i>	<i>màkərà</i>	<i>ufādà</i>	<i>ʔzàrà</i>
PLamang	<i>*palaw // *tikʷi // *tala // *dìn</i>	<i>*hisira</i>	<i>*hikina</i>	<i>*wifad</i>	<i>*hʷitaf</i>
PMandara	<i>*palaw // *tikʷi</i>	<i>*biwa // *mitsay</i>	<i>*hikiri = *hikirda</i>	<i>*ufadì</i>	<i>*ʔzidim = *ʔiziba</i>
PPodoko	<i>*kʷitira</i>	<i>*isira</i>	<i>*makira</i>	<i>*ufada</i>	<i>*ʔama</i>

Language	6	7	8	9	10
Lamang	<i>m̀kwá / m̀kuwá</i>	<i>əlfáná</i>	<i>təyásá</i>	<i>təmbáyá</i>	<i>ywáná</i>
Alataghwa	<i>ŋkua</i>	<i>lfanga</i>	<i>tghasa</i>	<i>təmbáyá</i>	<i>ghuana</i>
Turu	<i>muku</i>	<i>ndfan</i>	<i>təghas</i>	?	<i>ghwan</i>
Vemgo/Vizik	<i>əŋko, mku</i>	<i>rəfan</i>	<i>tixas</i>	<i>tumbai</i>	<i>(ə)wan</i>
Vemgo-Mabas	<i>ŋku</i>	<i>ləfàn</i>	<i>təyàs</i>	<i>təmbàj</i>	<i>yəwàn</i>
Gvoko	<i>ŋkoyò</i>	<i>ntfangò</i>	<i>təyasò</i>	<i>tìmbayò</i>	<i>yʷanğò</i>
Hdi	<i>m̀kúʔ</i>	<i>ndəfán</i>	<i>təyás</i>	<i>təmbáy / timbe</i>	<i>ywàn</i>
Hidi	<i>m̀kwá</i>	<i>ndəfán</i>	<i>təRás</i>	<i>tìmbéd</i>	<i>Rəwàn</i>
Dghwede	<i>ŋkwe</i>	<i>wudfi</i>	<i>təyàše / təxəse</i>	<i>təmbə</i>	<i>ywànğa</i>
Gava	<i>ŋkwaxà</i>	<i>wùdíf(à)</i>	<i>təyəs(à)</i>	<i>vəsuləmbəd(à)</i>	<i>kəldük(a)</i>
Guduf-Gava	<i>ŋkʷaxè</i>	<i>ùèdíf</i>	<i>təyəsè</i>	<i>vaslambədè</i>	<i>kuləkè</i>
Cinene	<i>ŋkʷaxà</i>	<i>ùdífà</i>	<i>təysà</i>	<i>vaslambədà</i>	<i>klawà</i>

Glavda ₁	<i>ɲkwax</i>	<i>uɗɪf</i>	<i>táxs</i>	<i>vaslambad</i>	<i>klàáwá</i>
Glavda ₂	<i>ɲkwàxà</i>	<i>wuɗɪfà</i>	<i>táxsà</i>	<i>vàsòlám̀bàd̀à</i>	<i>kolàwà</i>
Glavda ₃	<i>ɲkwax(a)</i>	<i>úɗɪfà</i>	<i>táxsà</i>	<i>vàsə̀lambàdà</i>	<i>kə̀lawà</i>
Nakatsa	<i>ɲkwaxà</i>	<i>wùɗɪfè</i>	<i>tə̀ɲsə̀</i>	<i>vəsə̀lám̀bàd̀à</i>	<i>kalawò</i>
Mora	<i>ə̀ɲkwáhé</i>	<i>və̀wɪyè</i>	<i>tísè</i>	<i>màsə̀lmànè</i>	<i>kə̀làwà, kə̀ladzúbə̀wà</i>
Wandala ₁	<i>unkwé</i>	<i>vúyè</i>	<i>tiise</i>	<i>màsə̀lmanè</i>	<i>kə̀lawà</i>
Wandala ₂	<i>ɲkwàxè</i>	<i>vuyè</i>	<i>tísè</i>	<i>məsilmànè</i>	<i>kùlàwà</i>
Wandala ₃	<i>nkòhé</i>	<i>tísè</i>	<i>màsə̀lmānē</i>	<i>tschémtuke</i>	<i>kláúé</i>
Wandala ₄	<i>uɲkohe</i>	<i>vúyè</i>	<i>tise</i>	<i>masilmane</i>	<i>išumi</i>
Wandala ₅	<i>ú̀nkohē</i>	<i>wúyè</i>	<i>tíse</i>	<i>masilmánne</i>	<i>kelaua</i>
Wandala ₆	<i>ú̀ɲkwéhé</i>	<i>vúyè</i>	<i>tísè</i>	<i>màsə̀lmànè</i>	<i>kə̀làwà</i>
Wandala ₇	<i>n'quaha</i>	<i>vanyah</i>	<i>tisah</i>	<i>musselman</i>	<i>klaañ</i>
Podokwo ₁	<i>mə̀kuwa</i>	<i>madə̀fa</i>	<i>za</i>	<i>metirə̀ce</i>	<i>jima</i>
Podokwo ₂	<i>mokūa</i>	<i>madufa</i>	<i>eza</i>	<i>metecar</i>	<i>ɣima</i>
Podokwo ₃	<i>mə̀kwá</i>	<i>mā̀dɗ́fá</i>	<i>ə̀zzá</i>	<i>mā̀tə̀rcá</i>	<i>dzìmiyà, dzim dar sərə</i>
PLamang PMandara	<i>*mkiwa</i> <i>*mikiwah</i>	<i>+rdfaɲ</i> <i>*midɪfi</i> <i>+vabiwa</i>	<i>*tiyis</i> <i>*tiyis</i> <i>+izza < +isira</i>	<i>+timbadə̀y</i> <i>+visulimbadə̀y</i> <i>+masilmanay</i>	<i>*y'wan</i> <i>*kilawa</i>
PPodokwo	<i>+mikiwa</i>	<i>+madɪfa</i>	<i>dzim 10-2?</i>	<i>+matirtsay</i>	<i>+dzim</i>

Alataghwa numerals by H. Büchner via Ekkerhard Wolff (1971: 64).

Cinene numerals by Kim Hak-Soo (2008) <https://mpi-lingweb.shh.mpg.de/numeral/Cinene.htm>

Dghwede = Zə̀ɲwana numerals by Charles Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Dghwede.htm>

Gava numerals by Charles Kraft (1981, III: 123).

Glavda₁ numerals by Jonathan Owens (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Glavda.htm>

Glavda₂ numerals by Charles Kraft (1981, III: 98).

Glavda₃ numerals by E.L. Rapp apud Ekkerhard Wolff (1971: 68).

Guduf-Gava numerals by Kim Hak-Soo (2008) <https://mpi-lingweb.shh.mpg.de/numeral/Guduf-Gava.htm>

Gvoko numerals by Kim Hak-Soo (2008) <https://mpi-lingweb.shh.mpg.de/numeral/Gvoko.htm>

Hdi = Hdi numerals by Cindy Langermann (1994) + Ndokobaï (2008)

<https://mpi-lingweb.shh.mpg.de/numeral/Hadi.htm>

Hidi numerals by Véronique de Colombel (letter from the Oct 20, 1987).

Lamang = Hidkala numerals by Ekkerhard Wolff 1988 <https://mpi-lingweb.shh.mpg.de/numeral/Lamang.htm>

Lamang.htm

Mora numerals by Véronique de Colombel (letter from the Oct 20, 1987).

Nakatsa numerals by Charles Kraft (1981, III: 135).

Podokwo₁ numerals by Elizabeth Jarvis <https://mpi-lingweb.shh.mpg.de/numeral/Podoko.htm>

Podokwo₂ numerals by Johannes Lukas (1937: 127).

Podokwo₃ numerals by Véronique de Colombel (letter from the Oct 20, 1987).

Turu numerals by P.K. Eguchi via Ekkerhard Wolff (1971: 64).

Vemgo-Mabas numerals by Ndokobaï (2008) <https://mpi-lingweb.shh.mpg.de/numeral/Vemgo-Mabas.htm>

Vemgo/Vizik numerals by Charles K. Meek apud Ekkerhard Wolff (1971: 64).

Wandala₁ (Malgwa) numerals by Doris Löhr <https://mpi-lingweb.shh.mpg.de/numeral/Wandala.htm>

Wandala₂ numerals by Charles Kraft (1981, III: 86).

Wandala₃ numerals by Kurt Strümpell (1923)

Wandala₄ numerals by Jean Mouchet (1950: 58-59).

Wandala₅ numerals by Heinrich Barth (1862: 9, 11).

Wandala₆ numerals by Johannes Lukas (1937: 121).

Wandala₇ numerals by Julius H. Klaproth (1862: 34-36).

2.5. Mafa – Mada

Language	1	2	3	4	5
Muktele ₁	<i>tékwálá</i>	<i>sàlà</i>	<i>mákr</i>	<i>ùfád</i>	<i>ǰii</i>
Matal	<i>dì / tēkùlā</i>	<i>sīlā</i>	<i>màkìr</i>	<i>ùfád</i>	<i>ìǰù</i>
Giziga ₁ N.	<i>blà, tidka, pàl</i>	<i>cēw</i>	<i>mà:kàr</i>	<i>m̀fád</i>	<i>ǰòm</i>
Giziga ₂ S.	<i>plá</i>	<i>cúw</i>	<i>máakər</i>	<i>m̀əfád</i>	<i>ǰúm</i>
Giziga ₃	<i>búlā, b̀əlā</i>	<i>cēw</i>	<i>màakər</i>	<i>m̀ufád</i>	<i>dlòm</i>
Giziga ₄	<i>sala</i>	<i>tschu</i>	<i>mākər</i>	<i>m̀fāt</i>	<i>sòm</i>
Muturua	<i>plola</i>	<i>tschiu</i>	<i>makir</i>	<i>mufát</i>	<i>sūin</i>
Muktele ₂	<i>den</i>	<i>tschu</i>	<i>mākáng</i>	<i>mo(a)fod</i>	<i>lindam</i>
Baldamu	<i>blà card., ndéj det.</i>	<i>cáv</i>	<i>màakáŋ</i>	<i>m̀òovún/l</i>	<i>ziindám</i>
Zelgwa ₁	<i>īlék</i>	<i>s̀ólā</i>	<i>màkár</i>	<i>fád</i>	<i>èǰām</i>
Zelgwa ₂	<i>ilik</i>	<i>s̀ula</i>	<i>màkər</i>	<i>əfád</i>	<i>ə̀zləm</i>
Zelgwa ₃	<i>lek</i>	<i>s̀ulə</i>	<i>m̀qkər</i>	<i>fəd</i>	<i>žəm</i>
Matakam ₂	<i>lek</i>	<i>s̀ülö</i>	<i>m̀kár</i>	<i>fūāt</i>	<i>lam</i>
Dugwor	<i>bek</i>	<i>səla</i>	<i>makar</i>	<i>məfad</i>	<i>zlam</i>
Matakam ₃	<i>stəd</i>	<i>čěčew</i>	<i>m̀qkər</i>	<i>fad</i>	<i>žəm</i>
Magumaz	<i>s̀ətád</i>	<i>cawə</i>	<i>m̀hkər</i>	<i>fád</i>	<i>ǰám</i>
Mafa ₁	<i>s̀átád</i>	<i>cew / cecew</i>	<i>makár</i>	<i>fád</i>	<i>zlám</i>
Mafa ₂	<i>stád</i>	<i>cáv</i>	<i>m̀kâar</i>	<i>fad</i>	<i>ðam</i>
Mafa ₃	<i>s̀átá</i>	<i>cawə</i>	<i>m̀kár</i>	<i>fád</i>	<i>ǰám</i>
Sulede	<i>stá</i>	<i>cawə</i>	<i>m̀kàr</i>	<i>fád</i>	<i>ǰám</i>
Mufo	<i>sta</i>	<i>tscho</i>	<i>m̀kár</i>	<i>fat</i>	<i>ldam</i>
Merey	<i>nətē</i>	<i>s̀ulò</i>	<i>m̀kàr</i>	<i>fád</i>	<i>ǰám</i>
Mikiri	<i>ntáy</i>	<i>s̀ilá</i>	<i>m̀kàr</i>	<i>m̀ufád</i>	<i>ǰóm</i>
Mofu N.	<i>nettey</i>	<i>suho</i>	<i>makar</i>	<i>fád</i>	<i>ǰám</i>
Mofu ₁	<i>áçta</i>	<i>čew</i>	<i>m̀qkər</i>	<i>fwot</i>	<i>dlom</i>
Cuvok	<i>ámətà</i>	<i>átj̄ew</i>	<i>m̀ákàr</i>	<i>fád</i>	<i>ǰám</i>
Matakam ₁	<i>umtá</i>	<i>tschischéo</i>	<i>mackkar</i>	<i>fūāt</i>	<i>lám / lsám</i>
Mefe ₁	<i>mətá</i>	<i>cécèw</i>	<i>m̀hkər</i>	<i>fwád</i>	<i>ǰám</i>
Mefe ₂	<i>mətá</i>	<i>cecewə</i>	<i>m̀hkər</i>	<i>f̀əwád</i>	<i>ǰám</i>
Mada ₁	<i>f̀ətēk</i>	<i>s̀elá</i>	<i>m̀hkər</i>	<i>ùfád</i>	<i>ǰám</i>

Mada ₂	<i>ftek</i>	<i>séla</i>	<i>mahkar</i>	<i>wfaaë</i>	<i>zzlaèm</i>
Mada ₃	<i>fəték</i>	<i>səla</i>	<i>maḥkər</i>	<i>fəɗ</i>	<i>zəm</i>
Muyang ₁	<i>bilīŋ</i>	<i>ciyáw</i>	<i>màhkār</i>	<i>fād</i>	<i>ɣàm</i>
Muyang ₂	<i>bilīŋ</i>	<i>tŷ</i>	<i>màhkār</i>	<i>fād</i>	<i>ɣàm</i>
Moloko	<i>biléŋ</i>	<i>tŷw</i>	<i>màkár</i>	<i>ùfád / mɔ́fád</i>	<i>ɣòm</i>
Baka	<i>bàlèŋ</i>	<i>cew</i>	<i>màkar</i>	<i>wúfad</i>	<i>zlàm</i>
Uldeme ₁	<i>fēléŋ</i>	<i>brētŷáw / tŷáw</i>	<i>mākár</i>	<i>māfád</i>	<i>ɣàm</i>
Uldeme ₂	<i>sēléŋ</i>	<i>(bàrà)céwá</i>	<i>màkàr</i>	<i>māfád</i>	<i>ɣàm</i>
Uzlam	<i>šéleŋ</i>	<i>bręçɔ</i>	<i>mākar</i>	<i>mɔ́fad</i>	<i>zəm</i>
Mofu Gudur	<i>ted / ték (counting)</i> <i>pál (enumeration)</i>	<i>tsew</i>	<i>máakar</i>	<i>məfad</i>	<i>ɣam</i>
Mofu ₂	<i>pal / tek</i>	<i>cew</i>	<i>máakar</i>	<i>məfad</i>	<i>ɣam</i>
Mufu	<i>kérték</i>	<i>tschéú</i>	<i>makang</i>	<i>fúɗó</i>	<i>děrom</i>
Mbuko ₁	<i>kərtek</i>	<i>tsew</i>	<i>maakaŋ</i>	<i>fúɗó</i>	<i>dára</i>
Mbuko ₂	<i>kərtek</i>	<i>cew</i>	<i>máakan</i>	<i>fáɗó</i>	<i>dára</i>
Mbuko ₃	<i>kirték</i>	<i>çéú</i>	<i>mākaŋ</i>	<i>fúɗɔ</i>	<i>dára</i>
Hurzo ₁	<i>bīlē</i>	<i>ciyaw</i>	<i>máŋgān</i>	<i>fəwdāw</i>	<i>dārā</i>
Hurzo ₂	<i>bīle</i>	<i>çɔ̄</i>	<i>mákaŋ,</i> <i>māŋgaŋ</i>	<i>fúɗo</i>	<i>dára</i>
Vame	<i>bilé</i>	<i>tŷáw</i>	<i>máŋgān</i>	<i>fú.dāw</i>	<i>dá.rà</i>
PM-M ^R	<i>*bili(n)</i>	<i>*səl / *tsaw</i>	<i>*ma-kar</i>	<i>*ma-fad</i>	<i>*dlam</i>
PMuktele	<i>+tik^w-ila</i>	<i>+sila</i>	<i>+makir</i>	<i>+ɣufad</i>	<i>+ɣiw</i>
PZulgo	<i>+ɣilik</i>	<i>+silaw</i>	<i>+makir</i>	<i>+ɣifad</i>	<i>+ɣiɣam</i>
PMafa ^G	<i>+sitaɗ</i>	<i>+tsaw</i>	<i>*mahkar</i>	<i>*fad</i>	<i>*ɣam</i>
PMefele	<i>+(ɣa)mita</i>	<i>+(ts)atsaw</i>	<i>*mahkar</i>	<i>+fiwad</i>	<i>+ɣam</i>
PMada	<i>+fi-tik</i>	<i>+sila</i>	<i>+mahkar</i>	<i>+wifad</i>	<i>+ɣam</i>
PMofu ^G	<i>+tik^w// *pal</i>	<i>*siwla</i>	<i>*mahkir</i>	<i>*wifad</i>	<i>*ɣim</i>
PMbuko ^G	<i>+tik^w</i>	<i>*tsaw</i>	<i>*maakan</i>	<i>*fudaw</i>	<i>+dara(m)</i>
PHurzo	<i>+bilay</i>	<i>+tsiyaw</i>	<i>+māŋgan</i>	<i>+furdaw</i>	<i>+dara</i>
PMarwa ^G	<i>+pal/+bila/+sala/ +den</i>	<i>*tsiw</i>	<i>*maakaŋ</i>	<i>*mufad</i>	<i>*ɣi^wdam</i>
PUldeme	<i>+šeleŋ</i>	<i>+biri-tsiw</i>	<i>+makar</i>	<i>+mifad</i>	<i>+ɣam</i>

Language	6	7	8	9	10
Muktele ₁	<i>mūkᵛā</i>	<i>māɗāf</i>	<i>mitigis̄</i>	<i>lādḡà</i>	<i>kùlā</i>
Matal	<i>múk^vā</i>	<i>mīɗif</i>	<i>mitigif</i>	<i>làɗigà</i>	<i>kùlù</i>
Giziga ₁ N.	<i>mérkéɗ</i>	<i>tà.rnà</i>	<i>dà:ḡàfād</i>	<i>ngòltēr</i>	<i>kró</i>
Giziga ₂ S.	<i>mérkéɗ</i>	<i>tàrnà</i>	<i>dāngāfād</i>	<i>ngòltír</i>	<i>kírú</i>
Giziga ₃	<i>méerkéɗ</i>	<i>tàarnà</i>	<i>dāgāfād</i>	<i>ŋò(o)ltír</i>	<i>kírú</i>
Giziga ₄	<i>mérkin</i>	<i>tārná</i>	<i>dagafat</i>	<i>woltir</i>	<i>kúrú</i>
Muturua	<i>maerké</i>	<i>tārnă</i>	<i>dāngāfă</i>	<i>gòltír</i>	<i>kúrrŭ</i>

Muktele ₂	<i>mérkě</i>	<i>túrnū</i>	<i>sābūr</i>	<i>sabla</i>	<i>kúrū</i>
Baldamu	<i>mérki</i>	<i>túrú</i>	<i>sābūr</i>	<i>zàá.bàlà</i>	<i>kúrú</i>
Zelgwa ₁	<i>ndilék</i>	<i>təsəla</i>	<i>camakar</i>	<i>cód</i>	<i>kóró</i>
Zelgwa ₂	<i>ndilik</i>	<i>təsəlá</i>	<i>tsàmàkàr</i>	<i>tswíd</i>	<i>kúrwá</i>
Zelgwa ₃	<i>ndilek</i>	<i>təsəla</i>	<i>tsamáqkar</i>	<i>čwöd</i>	<i>kúra</i>
Matakam ₂	<i>dělék</i>	<i>děsělá</i>	<i>samaka</i>	<i>schöt</i>	<i>küró</i>
Dugwor	<i>mukwa</i>	<i>tsela</i>	<i>tsaamakar</i>	<i>tseud</i>	<i>kurow</i>
Matakam ₃	<i>mókɔ</i>	<i>tsáraq</i>	<i>tsamáqkat</i>	<i>čüd</i>	<i>kúla</i>
Magumaz	<i>məkwá</i>	<i>càrad</i>	<i>càmàkád</i>	<i>cəwéd</i>	<i>kwəlà</i>
Mafa ₁	<i>mokwa</i>	<i>tsárad</i>	<i>tsamakád</i>	<i>céd</i>	<i>kula</i>
Mafa ₂	<i>mókwá</i>	<i>tsarad</i>	<i>tsəmákád</i>	<i>cuđ</i>	<i>k(w)ula</i>
Mafa ₃	<i>məkwá</i>	<i>cárad</i>	<i>càmàkád</i>	<i>cəwéd</i>	<i>kwəlà</i>
Sulede	<i>məká</i>	<i>cárad</i>	<i>càmàkád</i>	<i>cíd</i>	<i>kwəlà</i>
Mufo	<i>mókbá</i>	<i>sěrrá</i>	<i>zámákát</i>	<i>tschoet</i>	<i>pella</i>
Merey	<i>m̀kò</i>	<i>tàsəlà</i>	<i>tsà:mà:kàr</i>	<i>cód</i>	<i>krôw</i>
Mikiri	<i>múk^vó</i>	<i>tàsəlà</i>	<i>tsàmàkàr</i>	<i>céd</i>	<i>kúrró</i>
Mofu North	<i>mukó</i>	<i>taasəlá</i>	<i>tsamakàŋ</i>	<i>tsəd</i>	<i>kuro</i>
Mofu ₁	<i>múkɔ</i>	<i>čila, tsəla</i>	<i>čákər</i>	<i>tsúfwat</i>	<i>kúɔ</i>
Cuvok	<i>máákwà</i>	<i>tàsəlà</i>	<i>ŷháákàr</i>	<i>ŷhúđ</i>	<i>kùrəw</i>
Matakam ₁	<i>mūkóá</i>	<i>zəlát</i>	<i>tzáčkār</i>	<i>tschüēt</i>	<i>dumbauk</i>
Mefele ₁	<i>mókwá</i>	<i>tsəlád</i>	<i>ŷháhkàr</i>	<i>ŷhúđ</i>	<i>dùmbók</i>
Mefele ₂	<i>məkwá</i>	<i>təsəlád</i>	<i>cáhkàr</i>	<i>cəwđ</i>	<i>dəmbáku</i>
Mada ₁	<i>məkwó</i>	<i>eāsłá</i>	<i>eālāhkār</i>	<i>ábùlumbò</i>	<i>dzùmòk</i>
Mada ₂	<i>mokkoà</i>	<i>slaasəlaà</i>	<i>slalahkaàr</i>	<i>oàboèlmbòè</i>	<i>dzmoèkw</i>
Mada ₃	<i>múkwō</i>	<i>eətsəla</i>	<i>ə́lákər</i>	<i>abúlumbɔ</i>	<i>dzúmɔk</i>
Muyang ₁	<i>múkwō</i>	<i>āđáskālā</i>	<i>ā́lálárkār</i>	<i>āmbólmbō</i>	<i>kērāw</i>
Muyang ₂	<i>mók^vū</i>	<i>āđáskālā</i>	<i>ā́láláxkār</i>	<i>āmbólmbō</i>	<i>krū</i>
Moloko	<i>mók^vó</i>	<i>ŷiséré</i>	<i>lálákár</i>	<i>hólómbó</i>	<i>k^vóró</i>
Baka	<i>múku</i>	<i>sisiri</i>	<i>slalákúr</i>	<i>holombo</i>	<i>kru</i>
Uldeme ₁	<i>mókō</i>	<i>səsəlā</i>	<i>fərfád</i>	<i>álbit</i>	<i>kōlō</i>
Uldeme ₂	<i>məkwá</i>	<i>səsəlā</i>	<i>fərfád</i>	<i>élbit</i>	<i>kəlāw</i>
Uzlam	<i>múku</i>	<i>səsəla</i>	<i>fərfád</i>	<i>albit</i>	<i>kúlɔ</i>
Mofu Gudur	<i>maakwáw</i>	<i>maasála</i>	<i>daangafád</i>	<i>ɟam-leték / -leted</i>	<i>kúráw</i>
Mofu ₂	<i>maakwáw</i>	<i>maasála</i>	<i>daakafád</i>	<i>ɟam leték</i>	<i>kúráw</i>
Mufu	<i>b(ě)rká</i>	<i>tschibe</i>	<i>schumakang</i>	<i>děsüđ</i>	<i>kru</i>
Mbuko ₁	<i>mbərka</i>	<i>tsuwbe</i>	<i>dzəmaakan</i>	<i>dəsudó</i>	<i>kuro</i>
Mbuko ₂	<i>mbərka</i>	<i>cúbe</i>	<i>jəmáákan</i>	<i>dəsədó</i>	<i>kúró</i>
Mbuko ₃	<i>mbúrka</i>	<i>čibe</i>	<i>nəfúđofudɔ ɟuməkən</i>	<i>dúsudɔ</i>	<i>kúɔ</i>
Hurzo ₁	<i>márkā</i>	<i>cibā</i>	<i>zire</i>	<i>tóhkē</i>	<i>dzəm</i>

Hurzo ₂	<i>márkà</i>	<i>číbà</i>	<i>žirè</i>	<i>taḥkè</i>	<i>žim</i>
Vame	<i>márkà</i>	<i>tšibà</i>	<i>zi:rè</i>	<i>táhkè</i>	<i>džem</i>
PM-M ^R	* <i>muku</i>		* <i>tlal-kar</i>	*- <i>lumbo</i>	* <i>kuraw</i> / * <i>dzim</i>
PMuktele	+ <i>muk^wa</i>	+ <i>midif</i>	+ <i>mitigiš</i>	+ <i>ladiga</i>	+ <i>kulaw</i>
PZelgwa	+ <i>ndilik</i>	+ <i>tisila</i>	+ <i>samakir</i>	+ <i>tsuwid</i>	+ <i>kuraw</i>
PMafa ^G	* <i>mak^wa</i>	* <i>tsarad</i>	+ <i>samakard</i>	+ <i>tsuwad</i>	* <i>k^wiraw</i>
PMefele	+ <i>mik^wa</i>	+ <i>tisilad</i>	+ <i>tsahkar</i>	+ <i>tsiwid</i>	+ <i>dimbaku</i>
PMada	+ <i>mik^waw</i>	+ <i>lasila</i>	+ <i>lalahkar</i>	+ <i>abulumɓaw</i>	+ <i>dzumik^w</i>
PMofu ^G	* <i>mik^waw</i>	* <i>tasila</i>	+ <i>dangafad</i>	+ <i>tsufwad</i>	* <i>kiraw</i>
PMbuko ^G	* <i>marka</i>	+ <i>tsiwɓay</i>	+ <i>nifudawfudaw</i>	+ <i>disuwɗaw</i>	+ <i>kuraw</i>
PHurzo	+ <i>marka</i>	+ <i>tsiwɓay</i>	+ <i>dzi[ms]iray</i>	+ <i>tahkay</i>	+ <i>dzim</i>
PMarwa ^G	* <i>markid</i>	+ <i>tarna</i>	+ <i>dangafad</i>	+ <i>ɓwaltir</i>	* <i>kiri^w</i>
PUldeme	+ <i>mik^waw</i>	+ <i>sisila</i>	+ <i>fadfad</i>	+ <i>albit</i>	+ <i>k^wilaw</i>

Baka numerals by Roger Blench (2009b).

Baldamu numerals by Seignobos & Tourneux (1984: 27).

Cuvok numerals by Ndokobaï (2008) + (2009) <https://mpi-lingweb.shh.mpg.de/numeral/Cuvok.htm>

Dugwor numerals by Hubert Nkoumou (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Dugwor.htm>

Giziga₁ – North numerals by Henry Tourneux (1995) <https://mpi-lingweb.shh.mpg.de/numeral/Gizga-North.htm>

Giziga-North.htm

Giziga₂ – South numerals by Erin Shay (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Gizga-South.htm>

Giziga₃ numerals by Johannes Lukas (1970: 39).

Giziga₄ numerals by Kurt Strümpell (1923: 120-23).

Hurzo₁ = Gwendele numerals by Véronique de Colombel (letter from the Oct 20, 1987).

Hurzo₂ numerals by Jean Mouchet (1953: 194-95).

Mada₁ numerals by Véronique de Colombel (letter from the Oct 20, 1987).

Mada₂ numerals by Huber Nkoumou (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Mada.htm>

Mada₃ numerals by Jean Mouchet (1953: 194-95).

Mafa₁ numerals by Henry Tourneux (1995) <https://mpi-lingweb.shh.mpg.de/numeral/Mafa.htm>

(cf. Barreteau & Le Bléis 1990: 52)

Mafa₂ = Matakam numerals by Charles Kraft (1981, III: 145).

Magumaz numerals by Véronique de Colombel (letter from the Oct 20, 1987).

Matakam₁ numerals by Kurt Strümpell (1923: 120-23).

Matakam₂ numerals by Kurt Strümpell (1923: 120-23).

Matakam₃ numerals by Jean Mouchet (1953: 194-95).

Matal numerals by Arjan Branger via Ginger Boyd (2013) <https://mpi-lingweb.shh.mpg.de/numeral/Matal.htm>

Matal.htm

Mbuko₁ numerals by Richard Gravina <https://mpi-lingweb.shh.mpg.de/numeral/Mbuko.htm>

Mbuko₂ numerals by Roger Blench (2009b).

Mbuko₃ numerals by Jean Mouchet (1953: 194-95).

Mefele numerals by Ndokobaï (2008) <https://mpi-lingweb.shh.mpg.de/numeral/Mefele.htm>

Merey numerals by Henry Tourneux (1995) <https://mpi-lingweb.shh.mpg.de/numeral/Merey.htm>

Mikiri numerals by Roger Blench (2009b).

Mofu₁ numerals by Jean Mouchet (1953: 194-95).

Mofu₂ numerals by Véronique de Colombel (letter from the Oct 20, 1987).

Mofu-Gudur numerals by Kenneth R. Hollingsworth <https://mpi-lingweb.shh.mpg.de/numeral/Mofu-Gudur.htm>

Mofu-Gudur.htm

Mofu – North numerals by Hubert Nkoumou (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Mofu-North.htm>

Mofu-North.htm

Moloko numerals by Diane Friesen (2007, 2012) <https://mpi-lingweb.shh.mpg.de/numeral/Moloko.htm>

Mufo numerals by Kurt Strümpell (1923: 120-23).

Mufu numerals by Kurt Strümpell (1923: 120-23).

Muktele₁ numerals by Véronique de Colombel (letter from the Oct 20, 1987).

Muktele₂ = Balda numerals by Kurt Strümpell (1923: 120-23).

Muturua numerals by Kurt Strümpell (1910: 456-58).

Muyang₁ numerals by Véronique de Colombel (letter from the Oct 20, 1987).

Muyang₂ numerals by Tony Smith <https://mpi-lingweb.shh.mpg.de/numeral/Muyang.htm>

Uldeme₁ = Wuzlam numerals by Willie Kinnaird <https://mpi-lingweb.shh.mpg.de/numeral/Ouldeme.htm>

Uldeme₂ numerals by Veronique de Colombel (1997: 47).

Uzlam numerals by Jean Mouchet (1953: 194-95).

Vame numerals by Willie Kinnaird <https://mpi-lingweb.shh.mpg.de/numeral/Vame.htm>

Zelgwa₁ = Zulgo numerals by Véronique de Colombel (letter from the Oct 20, 1987).

Zelgwa₂ = Zulgo-Gemzek numerals by Beat Haller (1994) <https://mpi-lingweb.shh.mpg.de/numeral/Gemzek.htm>

Gemzek.htm

Zelgwa₃ numerals by Jean Mouchet (1953: 194-95).

2.6. Sukur

Language	1	2	3	4	5
Sukur ₁	<i>kàlí</i>	<i>bák</i>	<i>máken</i>	<i>fwád'</i>	<i>ǵám</i>
Sukur ₂	<i>kali</i>	<i>bak</i>	<i>makín</i>	<i>fwɔt</i>	<i>lam</i>
Proto-Sukur	* <i>kili</i>	* <i>bak</i>	* <i>makín</i>	* <i>fwád'</i>	* <i>ǵam</i>

Language	6	7	8	9	10
Sukur ₁	<i>mókwa</i>	<i>mádáf</i>	<i>tàkàz</i>	<i>miçi / mili</i>	<i>ǵwàn</i>
Sukur ₂	<i>mukwa</i>	<i>madaf</i>	<i>tigiz</i>	<i>mɪxi (= mikhi)</i>	<i>wɔŋ</i>
Proto-Sukur	* <i>mik^wa</i>	* <i>madáf</i>	* <i>tɪyis</i>	* <i>mili</i>	* <i>waj</i>

Sukur₁ numerals by Herrmann Jungrathmayr <https://mpi-lingweb.shh.mpg.de/numeral/Sukur.htm>

Sukur₂ numerals by Meek (1931: 318).

2.7. Daba

Language	1	2	3	4	5
Buwal	<i>téyg^wòlèŋ</i>	<i>gḃák</i>	<i>māxkát^ṽ</i>	<i>ŋfát^ṽ</i>	<i>dzābán</i>
Gawar ₁	<i>taguleng</i>	<i>bak</i>	<i>māchkát</i>	<i>fát</i>	<i>tschébéng</i>
Mbedam	<i>ntad'</i>	<i>bak</i>	<i>maxkad'</i>	<i>mfad'</i>	<i>dʒəban</i>
Hina ₁	<i>ntá</i>	<i>sulod'</i>	<i>mahkad'</i>	<i>mfád'</i>	<i>dzəbuŋ</i>
Hina ₂	<i>ta</i>	<i>soló</i>	<i>māká</i>	<i>fa</i>	<i>səbón</i>
Hina ₃	<i>nta</i>	<i>sollo</i>	<i>māká</i>	<i>fa</i>	<i>səbín</i>
Gawar ₂	<i>takan</i>	<i>səray</i>	<i>makad'</i>	<i>fad'</i>	<i>jəbin</i>
Daba ₁	<i>təkən</i>	<i>sirəy</i>	<i>màkat</i>	<i>fwot</i>	<i>jìbun</i>

Daba ₂	<i>takán</i>	<i>sorā</i>	<i>māká</i>	<i>fó(d)</i>	<i>dschöben</i>
Daba ₃	<i>tākán</i>	<i>sěrai</i>	<i>mākāt</i>	<i>fö(d)</i>	<i>jībín</i>
Musugeu	<i>takan</i>	<i>sray</i>	<i>makat</i>	<i>fwød</i>	<i>jəbuŋ</i>
*	⁺ <i>takan</i> ⁺ <i>ntad</i>	[*] <i>ɓik</i> [*] <i>siraj</i>	[*] <i>mahkad</i>	[*] <i>wifad</i> = ⁺ <i>miƿwad</i>	[*] <i>dzabin</i>

Language	6	7	8	9	10
Buwal	<i>ŋ^wk^váx</i>	<i>ŋ^líle⁷</i>	<i>dzāmāxkāt</i>	<i>dzáfāt</i>	<i>wám</i>
Gawar ₁	<i>nkō(ch)</i>	<i>schilé</i>	<i>jāmāchkāt</i>	<i>jǎfāt</i>	<i>wam</i>
Mbedam	<i>ŋkwax</i>	<i>diŋliɗ</i>	<i>dzamaxkad</i>	<i>tsafad</i>	<i>wam</i>
Hina ₁	<i>ñkú</i>	<i>disilùɗ</i>	<i>fáɗfáɗ</i>	<i>varkanta</i>	<i>gə̀b</i>
Hina ₂	<i>nku</i>	<i>dsílé(t)</i>	<i>fāɗfāɗ</i>	<i>berkantá</i>	<i>gē</i>
Hina ₃	<i>nkō</i>	<i>tsilé / dsilé</i>	<i>fadefāt</i>	<i>bārkantá</i>	<i>gě(b)</i>
Gawar ₂	<i>koh</i>	<i>cesired</i>	<i>ɕafadɕafad</i>	<i>ɗərfatakan</i>	<i>guɓ tɔ̀ba tɔ̀ba</i>
Daba ₁	<i>kwox</i>	<i>cišire</i>	<i>ciƿɕiƿɕ</i>	<i>ɗirƿɕɕɕ</i>	<i>gup</i>
Daba ₂	<i>kū(é)</i>	<i>dschoe será</i>	<i>tschötsch fǎ</i>	<i>gərf gātākán</i>	<i>gō⁽ⁿ⁾</i>
Daba ₃	<i>kō</i>	<i>sěré^t</i>	<i>sfatsfat</i>	<i>ɗərfātākán</i>	<i>gǔ(b)</i>
Musugeu	<i>kuh</i>	<i>čisrey</i>	<i>čufatčufat</i>	<i>drefkatakən</i>	<i>gup</i>
*	[*] <i>k^wah</i> = ⁺ <i>ŋk^wah</i>	[*] <i>tsasarad</i> = ⁺ <i>tsa-sirad</i>	⁺ <i>dzama-hkad</i> ⁺ <i>fáɗfáɗ</i> ⁺ <i>tsifadtsifad</i>	⁺ <i>dza[ma?]-fad</i> ⁺ <i>dirfa-takan</i>	⁺ <i>wam</i> ⁺ <i>guɓ</i>

Buwal numerals by Michael & Melanie Viljoen (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Buwal.htm>

Daba₁ numerals by Charles Kraft (1981, III: 156).

Daba₂ = Musugeu numerals by Hauptmann Strümpell (1910: 456-58).

Daba₃ numerals by Kurt Strümpell (1923: 120-23).

Gawar₁ numerals by Kurt Strümpell (1923: 120-23).

Gawar₂ numerals by Matthieu Dzia and Robert Hedinger (1994) <https://mpi-lingweb.shh.mpg.de/numeral/Daba.htm>

Hina₁ = Mina numerals by Hubert Nkoumou (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Mina.htm>

Hina₂ numerals by Kurt Strümpell (1910: 456-58).

Hina₃ numerals by Kurt Strümpell (1923: 120-23).

Mbedam numerals by Michael & Melanie Viljoen (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Mbedam.htm>

Musugeu numerals by Jean Mouchet (1950: 58-59).

2.8. Bata

Language	1	2	3	4	5
Mubi	<i>rūngoá</i>	<i>braie</i>	<i>máka</i>	<i>ñfáɗá</i>	<i>túfna</i>
Gude ₁	<i>tèen / rūŋ</i>	<i>bə̀ràɗy</i>	<i>mákk</i>	<i>ñfwáɗ</i>	<i>táƿ</i>
Gude ₂	<i>tán</i>	<i>bray</i>	<i>mak</i>	<i>ʔúnfwáɗ</i>	<i>tuf</i>

Bachama	<i>hidò</i>	<i>k̄pe</i>	<i>m̀wòkùn</i>	<i>fwət</i>	<i>tuf</i>
Mwulyen	<i>hídò / tèn</i>	<i>búk / bikǎ</i>	<i>mwàkín / maxkán</i>	<i>fwad / fwát'</i>	<i>túhf / túf</i>
Bata ₁	<i>hidó</i>	<i>bae</i>	<i>mōākén</i>	<i>fōá(t)</i>	<i>tūf</i>
Bata ₂	<i>hidọ</i>	<i>kpwe</i>	<i>mwakən</i>	<i>fwot</i>	<i>tuf</i>
Bata-Garua	<i>jido</i>	<i>te</i>	<i>moakén</i>	<i>fōát</i>	<i>tūf</i>
Bata-Demsa	<i>hido</i>	<i>pě</i>	<i>moakén</i>	<i>fōát</i>	<i>tūf</i>
Koboči	<i>hidi</i>	<i>baek</i>	<i>maukén</i>	<i>fōát</i>	<i>tūf</i>
Wadi	<i>hídò</i>	<i>bég</i>	<i>moakin</i>	<i>fōát</i>	<i>tūf</i>
Holma	<i>hido</i>	<i>beg</i>	<i>mōākén</i>	<i>fōát</i>	<i>tuf</i>
Nzanyi ₁	<i>hidē</i>	<i>buk</i>	<i>m̀d̄ifəl</i>	<i>fwət</i>	<i>tuf</i>
Nzanyi ₂	<i>hídò</i>	<i>beg</i>	<i>mēnfěn</i>	<i>fōát</i>	<i>tuf</i>
Nzanyi ₃	<i>hidọ</i>	<i>gbwək</i>	<i>mwòkən</i>	<i>fwat</i>	<i>tuf</i>
Gudu	<i>jáj</i>	<i>bæk</i>	<i>mā:kán</i>	<i>fwád</i>	<i>tūf</i>
*	⁺ <i>tan</i> ⁺ <i>hidaw</i>	[*] <i>ɸijak</i> = ⁺ <i>ɸiryak</i>	[*] <i>mahikin</i>	[*] <i>fʷad</i>	[*] <i>tɪfʷ</i>

Language	6	7	8	9	10
Mubi	<i>kōǎ</i>	<i>máděfā</i>	<i>tégessa</i>	<i>linga</i>	<i>pǎǎ</i>
Gude ₁	<i>kùwà</i>	<i>mədəf</i>	<i>təyás</i>	<i>illij</i>	<i>pu?</i>
Gude ₂	<i>kuwà</i>	<i>m̄idif(a)</i>	<i>t̄iyis(a)</i>	<i>ʔillij(à), ìd̄ij</i>	<i>pu(wà)</i>
Bachama	<i>tukwàltaka</i> 5 + 1	<i>tukòluḱpe</i> 5 + 2	<i>fwəfwat</i> 4 + 4	<i>d̀ambidò</i>	<i>bəw</i>
Mwulyen	<i>túkwàldéáká / b̄ər̄f̄ij</i>	<i>túkwaló?pé / t̄uḱús</i>	<i>fwáfwad</i> 4 + 4 / <i>m̄l̄ij̄</i>	<i>tàambidò / pó?</i>	<i>bù</i>
Bata ₁	<i>tūgoldaka</i>	<i>tugolpé</i>	<i>foafót</i>	<i>t̀ambidò</i>	<i>bō(ǎ)</i>
Bata ₂	<i>tòqol d̄ǎka</i>	<i>tòqol okpwe</i>	<i>fwatfwat</i>	<i>tambido</i>	<i>bōu</i>
Bata-Garua	<i>tokeldākǎ</i>	<i>tòkòlöpé</i>	<i>fāfāt</i>	<i>t̀ambiddò</i>	<i>bo</i>
Bata-Demsa	<i>tūkòldākǎ</i>	<i>tu kòlöpé</i>	<i>fōáfōát</i>	<i>t̀ambidò</i>	<i>bū</i>
Koboči	<i>koach</i>	<i>m̄skātū</i>	<i>foafoade</i>	<i>t̀ambidē</i>	<i>pū</i>
Wadi	<i>kōǎ</i>	<i>miskáta</i>	<i>foafat</i>	<i>t̀ambillo</i>	<i>pū</i>
Holma	<i>kōǎ</i>	<i>māskata</i>	<i>fōfoáddé</i>	<i>tawidde</i>	<i>pu</i>
Nzanyi ₁	<i>kwɔx</i>	<i>m̄skatè</i>	<i>fwəfwadè</i>	<i>təmbedè</i>	<i>pu</i>
Nzanyi ₂	<i>kōǎ</i>	<i>m̄skātā</i>	<i>fofoade</i>	<i>tanbidde</i>	<i>pu</i>
Nzanyi ₃	<i>kwaḣ</i>	<i>miskāta</i>	<i>fəfwadé</i>	<i>tambido</i>	<i>pu</i>
Gudu	<i>kwǎ</i>	<i>m̄skātā</i>	<i>f̄ɔrfwād</i>	<i>z̄tétəpən</i>	<i>pú</i>
PBata	[*] <i>kiwa</i> ⁺ <i>tukʷil-taka</i>	[*] <i>m̄idifij</i> ⁺ <i>tukʷil-bi[ry]ak</i> ⁻ <i>miskata</i>	[*] <i>t̄iyis</i> ⁺ <i>fʷadfʷad</i>	⁺ <i>ʔil̄lij̄</i> ⁺ <i>tambidaw</i>	⁺ <i>[g]paw</i>

Bachama by Russell G. Schuh (1989) <https://mpi-lingweb.shh.mpg.de/numeral/Bacama.htm>

Bata₁ numerals by Kurt Strümpell (1910: 456-58).

Bata₂ numerals by Jean Mouchet (1950: 58-59).

Bata-Demsa numerals by Kurt Strümpell (1923: 120-23).

Bata-Garua numerals by Kurt Strümpell (1923: 120-23).

Gude₁ numerals by Russell G. Schuh (1989 <https://mpi-lingweb.shh.mpg.de/numeral/Gude.htm>)

Gude₂ numerals by Charles Kraft (1981, III: 36),

Gudu numerals by Charles Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Gudu.htm>

Holma numerals by Kurt Strümpell (1923: 120-23).

Koboči numerals by Kurt Strümpell (1923: 120-23).

Mubi numerals by Kurt Strümpell (1923: 120-23) (a variety of Gude; ≠ Mubi of East Chadic origin)

Mwulyen = Jimi = Zumu numerals by Charles H. Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Jimi.htm>

Nzanyi₁ numerals by Charles Kraft (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Nzanyi.htm>

Nzanyi₂ numerals by Kurt Strümpell (1923: 120-23).

Nzanyi₃ numerals by Jean Mouchet (1950: 58-59).

Wadi numerals by Kurt Strümpell (1923: 120-23).

2.9. Gidar – Musgu

Language	1	2	3	4	5
Gidar ₁	<i>tákà</i>	<i>súlà</i>	<i>hókù</i>	<i>póđò</i>	<i>lé</i>
Gidar ₂	<i>tětākā</i>	<i>sūlā</i>	<i>hōkū</i>	<i>pōđō</i>	<i>ksē</i>
Mbara	<i>kitáy, dōw</i>	<i>mòk</i>	<i>ùhú</i>	<i>púđú</i>	<i>ìlím</i>
Munjuk	<i>kətay, daw</i>	<i>sulu</i>	<i>hu</i>	<i>puđu</i>	<i>slim</i>
Musgu ₁	<i>kitáy, dāw</i>	<i>súlú</i>	<i>hú</i>	<i>púđu</i>	<i>lím</i>
Musgu ₂	<i>katē</i>	<i>tšilo</i>	<i>hū</i>	<i>pōđu</i>	<i>χim</i>
Musgu ₃	<i>daya</i>	<i>tsoló</i>	<i>u</i>	<i>poru</i>	<i>šem</i>
Musgu ₄	<i>kedái, ketái</i>	<i>silú</i>	<i>hu</i>	<i>puđu</i>	<i>χim, šim</i>
Musgu ₅	<i>ketē</i>	<i>tšulo</i>	<i>hū</i>	<i>puđu</i>	<i>tim</i>
Musgu ₆	<i>dai</i>	<i>solú</i>	<i>hu</i>	<i>podú</i>	<i>tim</i>
Musgu ₇	<i>dai // degá</i>	<i>χillu // hudyú</i>	<i>hūū / hūuŋ</i>	<i>pudu // fūdi</i>	<i>sim // hrāo</i>
Muskum ₁	<i>degá</i>	<i>hujú</i>	<i>hūang</i>	<i>fūdi</i>	<i>hrāi</i>
Muskum ₂	<i>điga</i>	<i>wùzik</i>	<i>hú:wúŋ</i>	<i>fú:đi</i>	<i>hìrrày</i>
PGidar	<i>*takay/*katay</i>	<i>*siwla</i>	<i>*haku^{n?}</i>	<i>*pađá^w</i>	<i>*ta?</i>
PMusgu	<i>*daway</i>	<i>*sili</i>	<i>*?uhu^{n?}</i>	<i>*pidá^w</i>	<i>*?ilim</i>
PMuskum	<i>*điga</i>	<i>*hilyu?</i>	<i>*huwan < *hugaŋ?</i>	<i>*fudí</i>	<i>*hiray</i>

Language	6	7	8	9	10
Gidar ₁	<i>tré</i>	<i>bùhúl</i>	<i>dòdòpòrò</i>	<i>váytaḱ</i>	<i>kláú</i>
Gidar ₂	<i>sèrré</i>	<i>būl (bwul)</i>	<i>dédépòđò</i>	<i>waitáḱ</i>	<i>kēlaú</i>
Mbara	<i>lirá</i>	<i>mìgzàḱ / mùgzàḱ</i>	<i>mìsiláy / mùsiláy</i>	<i>wá:ŋá</i>	<i>dò:gò / dòk</i>
Munjuk	<i>slaara</i>	<i>mə(gə)zak</i>	<i>mit(i)wis</i>	<i>təkla / zleeŋe</i>	<i>doogo</i>
Musgu ₁	<i>là:rà</i>	<i>mìgzàḱ / mùgzàḱ</i>	<i>mitwis / mitis</i>	<i>tíklá</i>	<i>dò:gò</i>
Musgu ₂	<i>čāra</i>	<i>mugzāk</i>	<i>mitiš</i>	<i>čēŋgar</i>	<i>dógō</i>
Musgu ₃	<i>saāra</i>	<i>nogosap</i>	<i>meteš</i>	<i>takala</i>	<i>tor</i>
Musgu ₄	<i>čāra</i>	<i>múkezak</i>	<i>métūiš</i>	<i>dékela</i>	<i>dōgo</i>
Musgu ₅	<i>tará</i>	<i>mugzak</i>	<i>mutiš</i>	<i>tikela</i>	<i>dōgo</i>
Musgu ₆	<i>tara</i>	<i>mgzek</i>	<i>mtiš</i>	<i>ldenge</i>	<i>dóko, dogo</i>

Musgu ₇	<i>sāra//hrdīga</i>	<i>mugezák//māde</i>	<i>mutuūš // hasgaŋ</i>	<i>tíkilla // hrfidi</i>	<i>ndōgo // gum</i>
Muskum ₁	<i>hrdīga</i>	<i>mādi</i>	<i>hasgang</i>	<i>hrfidi</i>	<i>gúru</i>
Muskum ₂	<i>hirdí:gà</i>	<i>mà:dí</i>	<i>hà:skàŋ</i>	<i>hirífidí</i>	<i>kúru</i>
PGidar PMusgu	* <i>hira</i> * <i>hira</i>	* <i>busiwla</i> * <i>mukizak</i> cf. Mbara mòk 2	* <i>dadapaḏa</i> ^w * <i>muti[γ]iš</i> * <i>musilay</i>	* <i>vaytak</i> * <i>tíkila</i> * <i>ḥiyayay</i>	* <i>kilaw</i> * <i>dogo</i>
PMuskum	* <i>hiray-dīga</i>	Muskum ₂ wùzik 2 * <i>maadi</i>	* <i>haas-gaŋ</i> cf. * <i>hugaŋ</i> 3	* <i>hiray-fudí</i>	* <i>kuru</i>

Gidar₁ numerals by Zygmunt Frajzyngier (1996) <https://mpi-lingweb.shh.mpg.de/numeral/Gidar.htm>

Gidar₂ numerals by Hauptmann Strümpell (1910, 456-58).

Mbara numerals by Henry Tourneux (1988) <https://mpi-lingweb.shh.mpg.de/numeral/Mbara.htm>

Munjuk numerals by Henry Tourneux (1982).

Musgu₁ = Mulwi = Vlum = Mogroum numerals by Henry Tourneux (1977: 20-30; 1988)

<https://mpi-lingweb.shh.mpg.de/numeral/Musgu.htm>

Musgu₂ numerals by Heinrich Barth apud Johannes Lukas (1941).

Musgu₃ ('Masa') numerals by Decorse apud Johannes Lukas (1941); cf. Gaudefroy-Demombynes (1907: 249).

Musgu₄ numerals by Krause apud Johannes Lukas (1941).

Musgu₅ numerals by Overweg apud Johannes Lukas (1941).

Musgu₆ numerals by Rohlfs apud Johannes Lukas (1941).

Musgu₇ numerals by Röder apud Johannes Lukas (1941).

Muskum₁ = Musgum City numerals by Johannes Lukas (1937: 143).

Muskum₂ numerals by Tourneux (1977: 20-30).

2.10. Kotoko

Language	1	2	3	4	5
Buduma ₁	<i>gə̀tté</i>	<i>kí</i>	<i>gàkə̀nnə́</i>	<i>hígáy</i>	<i>hínjì</i>
Buduma ₂	<i>kéttè</i>	<i>kî</i>	<i>kākə̀nnə</i>	<i>hāyaj</i>	<i>sinjì</i>
Buduma ₃	<i>kéta</i>	<i>kîhi</i>	<i>kākə̀nè</i>	<i>hérai, sérai</i>	<i>hîndsi</i>
Buduma ₄	<i>kittā</i>	<i>kihî</i>	<i>kakinne</i>	<i>segay</i>	<i>sinji</i>
Kuri	<i>kete</i>	<i>kin</i>	<i>kakenne</i>	<i>kaï</i>	<i>šinji</i>
Ngala ₁	<i>takshán</i>	<i>kə̀shē</i>	<i>kíngə</i>	<i>kādi</i>	<i>khathaezi</i>
Ngala ₂	<i>tiksang</i>	<i>kisang</i>	<i>kinga</i>	<i>kadi</i>	<i>kishenshi</i>
Maŋam	<i>nté</i>	<i>gàsìy</i>	<i>gàkə̀rò</i>	<i>gàdè</i>	<i>l'èŋsi</i>
Afade ₂	<i>nté</i>	<i>gàsìy</i>	<i>gàkùrò</i>	<i>gàdè</i>	<i>l'èntsi</i>
Afade ₃	<i>pal</i>	<i>gasi</i>	<i>kàkuro</i>	<i>kadè</i>	<i>şə̀nsi</i>
Afade ₄	<i>te</i>	<i>anszih</i>	<i>ankró</i>	<i>gandéh</i>	<i>tāntih</i>
Afade ₅	<i>dīpan</i>	<i>wagāsi</i>	<i>gàkùru</i>	<i>wagāde</i>	<i>wasə̀ntshi</i>
Sahu	<i>ntè</i>	<i>gāŋsiy</i>	<i>gá:kə̀rà</i>	<i>gàndè</i>	<i>c'èŋsí</i>
Mpade = Makeri ₁	<i>pál</i>	<i>gāsì</i>	<i>gòkùrò</i>	<i>gādè</i>	<i>f'ə̀nsī</i>
Mpade = Makeri ₂	<i>nté</i>	<i>gàsìy</i>	<i>gòkùrò</i>	<i>gàdè</i>	<i>ş'ə̀nsi</i>
Makeri ₃	<i>pal</i>	<i>gasi</i>	<i>gokuro</i>	<i>gandè</i>	<i>şyə̀nsi</i>
Shoe	<i>nte</i>	<i>ansi</i>	<i>ankro</i>	<i>gade</i>	<i>sesi</i>
Gulfei ₁ = Malgbe	<i>nté</i>	<i>'éyá</i>	<i>'àkrà</i>	<i>gàndè</i>	<i>'ə̀nsi / l'ə̀nsi</i>

Gulfe ₁	<i>enté</i>	<i>ěá</i>	<i>ankrá</i>	<i>gandé</i>	<i>ainse</i>
Gulfe ₂	<i>nte</i>	<i>er</i>	<i>akra</i>	<i>ngandé</i>	<i>ensi</i>
Gulfe ₃	<i>ěnté</i>	<i>ěyá</i>	<i>àkrà</i>	<i>gāndé</i>	<i>ěnsi</i>
Gulfe ₄	<i>pal</i>	<i>geŋ</i>	<i>gak(ə)r</i>	<i>gandé</i>	<i>šensi</i>
Kuseri ₁ = Mser	<i>s'əyádiy</i>	<i>kícó</i>	<i>kákər</i>	<i>kádé</i>	<i>šěši</i>
Kuseri ₂	<i>tsegiden</i>	<i>kičə</i>	<i>kagər</i>	<i>kadé</i>	<i>səsi</i>
Kuseri ₃	<i>segedi</i>	<i>kitio</i>	<i>kákr</i>	<i>káde</i>	<i>səsi</i>
Huluf	<i>s'əyádiy</i>	<i>kisów</i>	<i>káxkər</i>	<i>kádé</i>	<i>šěši</i>
Kala-Kafra	<i>s'əyádiy</i>	<i>kisó</i>	<i>ká:kər</i>	<i>kádé</i>	<i>səsi</i>
Afade ₁	<i>sórəjā</i>	<i>sđā</i>	<i>gàrkə̀</i>	<i>gādē</i>	<i>fjfi</i>
Lagwan ₁	<i>səydia, tkú</i>	<i>χsdá</i>	<i>gáχkər</i>	<i>gāde</i>	<i>fěfi</i>
Lagwan ₂	<i>səyádiyà</i>	<i>χsdé</i>	<i>gáxhər</i>	<i>gádé</i>	<i>šěši</i>
Lagwan ₃	<i>səydia, tkú, bal^N</i>	<i>χsdá</i>	<i>gáχəkər</i>	<i>gáde</i>	<i>šěši</i>
Lagwan ₄	<i>tekū; serédiā</i>	<i>ksdē</i>	<i>gáχkir</i>	<i>gāde</i>	<i>səsi</i>
Zina = Jəyna	<i>cíyá</i>	<i>cúw</i>	<i>hòkwá</i>	<i>fowdty</i>	<i>hàrè</i>
Mazera	<i>ńciyàn</i>	<i>ńcò</i>	<i>hùnò</i>	<i>fudé</i>	<i>'ihré</i>
Ngodeni	<i>ńs'á</i>	<i>ńcò</i>	<i>'àxkwán</i>	<i>fò:dí</i>	<i>hxrè</i>
Mo'e	<i>ńs'á</i>	<i>ńcò</i>	<i>'àxkwán</i>	<i>fò:dí</i>	<i>hrè</i>
PKotoko PNKotoko PCKotoko Pisland Kotoko PSKotoko	<i>+tik / +tay / +pal</i> <i>+tiku / +tsi-γidiya / +bal</i> <i>+kittay</i> <i>+tsiya</i>	<i>*kasi</i> <i>*gasi</i> <i>*xisa</i> <i>*kihi</i> <i>*tsu</i>	<i>+gakiraw</i> <i>+kaxikir</i> <i>+kakinnay</i> <i>+xik'an</i>	<i>+ka-fday</i> <i>*gade = +gaday</i> <i>+gaday</i> <i>+higay</i> <i>*fodi</i>	<i>*lensi =</i> <i>+lentsi</i> <i>*l'entsi</i> <i>*feji</i> <i>*hi^ogi = +hinji</i> <i>+xihray</i>

Language	6	7	8	9	10
Buduma ₁	<i>hə̀ràkkə̀</i>	<i>tùlwár</i>	<i>wósəkə̀</i>	<i>hiligár</i>	<i>hákkán</i>
Buduma ₂	<i>hāráke</i>	<i>túlor</i>	<i>fəkú</i>	<i>hiligar</i>	<i>hākán</i>
Buduma ₃	<i>hárasgè, sáraskè</i>	<i>tulòr</i>	<i>hūásgè</i>	<i>héligār</i>	<i>hákán</i>
Buduma ₄	<i>sarásko</i>	<i>tylór</i>	<i>sōsku</i>	<i>seliyán</i>	<i>sėkan</i>
Kuri	<i>saraske</i>	<i>tolor</i>	<i>soske</i>	<i>(fi)liger</i>	<i>sekan</i>
Ngala ₁	<i>rasko</i>	<i>tyllur</i>	<i>kēdi gādī</i>	<i>nadāksáh</i>	<i>hākhkán</i>
Ngala ₂	<i>kingi ti kisang</i>	<i>tiksang ala gada</i>	<i>kadi kadi</i>	<i>ina tiksang</i>	<i>hakang</i>
Mařam	<i>frákərò</i>	<i>dúlò</i>	<i>gādè-gādē</i>	<i>nòlké</i>	<i>kàŋ</i>
Afade ₂	<i>frákúró</i>	<i>dúlò</i>	<i>gādè-gādē</i>	<i>nótè</i>	<i>kàŋ</i>
Afade ₃	<i>frákuro</i>	<i>dulo</i>	<i>gadegadé</i>	<i>noŋe</i>	<i>kāg</i>
Afade ₄	<i>frákro</i>	<i>dúllo</i>	<i>kadégadéh</i>	<i>nottéh</i>	<i>dėkang</i>
Afade ₅	<i>wafràkərō</i>	<i>adūro</i>	<i>wagadégādē</i>	<i>wánōte</i>	<i>wākán</i>
Sahu	<i>fə̀ràkərə̀</i>	<i>dùlù</i>	<i>frègandē</i>	<i>dáyý'á</i>	<i>kàŋ</i>
Mpade = Makeri ₁	<i>fěskótē</i>	<i>túlur</i>	<i>jiligādē</i>	<i>jàtálà</i>	<i>kán</i>
Mpade = Makeri ₂	<i>šěskótè</i>	<i>túlur</i>	<i>jili-/jidi-gādè</i>	<i>jàtállà</i>	<i>kàŋ</i>
Makeri ₃	<i>šyşkə̀pte</i>	<i>tulu</i>	<i>gādégadé</i>	<i>tyatalla</i>	<i>kāg</i>

Shoe	<i>seskote</i>	<i>tulur</i>	<i>gedégadé</i>	<i>deatala</i>	<i>kang</i>
Gulfei = Malgbe	<i>frékrà</i>	<i>tùllúr</i>	<i>frègàndè</i>	<i>díyáyá</i>	<i>kàŋ</i>
Gulfei ₂	<i>frékra</i>	<i>tulúr</i>	<i>fregandé</i>	<i>diaña</i>	<i>kān</i>
Gulfei ₃	<i>frekra</i>	<i>tulur</i>	<i>fregande</i>	<i>ndiaga</i>	<i>kang</i>
Gulfei ₄	<i>férékrà</i>	<i>tùllúr</i>	<i>feregāndè</i>	<i>dīaña</i>	<i>kaŋ</i>
Gulfei ₅	<i>frèk(ə)r</i>	<i>tullur</i>	<i>fregunde</i>	<i>tyaya</i>	<i>kāg</i>
Kuseri = Mser	<i>vrəkákər</i>	<i>kától</i>	<i>vrəkádè</i>	<i>nòrké</i>	<i>kàn</i>
Kuseri ₂	<i>vrəkade</i>	<i>katəl</i>	<i>vrəkade</i>	<i>nørke</i>	<i>kan</i>
Kuseri ₃	<i>wukákr</i>	<i>kátr</i>	<i>vrəkádè</i>	<i>núrgé</i>	<i>kān</i>
Huluf	<i>vrəkáxkər</i>	<i>kától</i>	<i>vrəkádè</i>	<i>nòtké</i>	<i>xkàn</i>
Kala-Kafra	<i>vrəkákər</i>	<i>kától</i>	<i>vrəkádè</i>	<i>nòtké</i>	<i>kàŋ</i>
Afade ₁	<i>və̀nārkə̀</i>	<i>kátul</i>	<i>viyāde</i>	<i>dijē</i>	<i>χkàn</i>
Lagwan ₁	<i>venāχ(ə)kər</i>	<i>kátul</i>	<i>venāde</i>	<i>diʔijən < Ar tisfa 9?</i>	<i>χkan</i>
Lagwan ₂	<i>vənāxkər</i>	<i>kátul</i>	<i>viyāde</i>	<i>dišidən</i>	<i>xkàn</i>
Lagwan ₃	<i>venāχəkər</i>	<i>kátul</i>	<i>venāde</i>	<i>diʔišən</i>	<i>χkan</i>
Lagwan ₄	<i>venāχkir</i>	<i>kátul</i>	<i>venyāde</i>	<i>dixiēn</i>	<i>χkàn</i>
Zina = Jəyna	<i>hàrkə̀ncíyá</i>	<i>ɣwàdàl</i>	<i>màɣəràdú</i>	<i>cíyágàkə̀</i>	<i>là̀bàkù</i>
Mazera	<i>ʔibíwè</i>	<i>mùsxwámè</i>	<i>fúdādè</i>	<i>fə̀rcādā</i>	<i>ʔisà`əm</i>
Ngodeni	<i>hxrè gəm s'á</i>	<i>hxrè gəm có</i>	<i>jàn fódíy</i>	<i>màgà̀nà húné s'á</i>	<i>là̀bàkù</i>
Mo`e	<i>hrè gəm s'á</i>	<i>hrè gəm có</i>	<i>jāŋ fódíy</i>	<i>màgà̀nà húní s'á</i>	<i>là̀bàkù</i>
PKotoko PNKotoko	<i>*vinahkír</i> <i>*vinahkír &</i> <i>*l'entsi-ku-tay</i>	< Kan. <i>tùllúr</i>	<i>*gadaygadáy</i>	<i>*inu tay finger 1</i> <i>*taya inaw finger 1</i>	<i>*kan</i>
PCKotoko Pisland Kotoko	<i>*vinahkír</i> < Kan. <i>araskə̀</i>	< <i>*ka-</i> + <i>tùllúr</i> < Kan. <i>tùllúr</i>	<i>*vinagadáy</i> < Kan. <i>wuskú</i>	<i>*inu tíku finger 1</i> < Kan. <i>lə̀gár</i>	<i>*hikan</i> <i>*hikan</i>
PSKotoko	<i>*xihray-kim-tsiya 5+1</i>	<i>*xihray-kim-tsu 5+2</i>	<i>*dzaŋ fodí &</i> <i>*foda-foday</i>	<i>*tsiya ... (minus 1)</i>	<i>*libaku</i>

Afade₁ numerals by Dakinodji Ngarmadjibé (1993 <https://mpi-lingweb.shh.mpg.de/numeral/Afade.htm>)

Afade₂ numerals by Henry Tourneux (2005).

Afade₃ numerals by Jean-Paul Lebeuf (1942: 172).

Afade₄ numerals by Ulrich J. Seetzen (beginning of the 19th cent.) apud Heinz Sölken (1967: 157, 173-178).

Afade₅ numerals by Heinrich Barth (1912; see Heinz Sölken (1967, 165-69).

Buduma₁ numerals by E. Ari Awagana (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Buduma.htm>

Buduma₂ numerals by Johannes Lukas (1939: 65).

Buduma₃ numerals by Sigismund W. Koelle (1854) apud Heinz Sölken (1967: 165-69).

Buduma₄ numerals by Heinrich Barth (1912; see Heinz Sölken (1967: 165-69).

Gulfei₁ = Malgbe numerals by Henry Tourneux (2005).

Gulfei₂ numerals by Adolf Friedrich apud Johannes Lukas (1937: 146).

Gulfei₃ numerals by Otto Röder apud Johannes Lukas (1937: 146).

Gulfei₄ numerals by Johannes Lukas (1937: 146).

Gulfei₅ numerals by Jean-Paul Lebeuf (1942: 172).

Huluf numerals by Henry Tourneux (2005).

Kala-Kafra numerals by Henry Tourneux (2005).

Kuri numerals by Decorse apud Maurice Gaudefroy-Demombynes (2007: 276).

Kuseri₁ = Mser numerals by Henry Tourneux (2005).

Kuseri₂ numerals by Jean-Paul Lebeuf (1942: 172).

Kuseri₃ numerals by Johannes Lukas (1937: 144).

Lagwan₁ numerals by Sean Allison (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Lagwan.htm>

Lagwan₂ numerals by Henry Tourneux (2005).

Lagwan₃ numerals by Johannes Lukas (1936: 53).

Lagwan₄ numerals by Heinrich Barth (1862: 9, 11).

Makeri₃ numerals by Jean-Paul Lebeuf (1942: 172).

Małam numerals by Henry Tourneux (2005).

Mazera numerals by Henry Tourneux (2005).

Mo'e numerals by Henry Tourneux (2005).

Mpade = Makeri₁ numerals by Sean Allison (2007) <https://mpi-lingweb.shh.mpg.de/numeral/Mpade.htm>

Mpade = Makeri₂ numerals by Henry Tourneux (2005).

Ngala₁ numerals by Heinrich Barth (1912); see Heinz Sölken (1967: 165-69).

Ngala₂ numerals by Frederick W.H. Migeod (1922); see Heinz Sölken (1967: 165-69).

Ngodeni numerals by Henry Tourneux (2005).

Sahu numerals by Henry Tourneux (2005).

Shoe numerals by Johannes Lukas (1937: 154).

Zina = Jəyna numerals by Henry Tourneux (2005).

2.11. Masa

Language	1	2	3	4	5
Herdé	<i>dāw</i>	<i>h^vóèb</i>	<i>hīndzi?</i>	<i>fidi?</i>	<i>vàl</i>
Lame ₁	<i>dāwà</i>	<i>h^vóòbò</i>	<i>hīnci?i</i>	<i>fūdi?i</i>	<i>vāl</i>
Lame ₂	<i>dāó</i>	<i>hōbō</i>	<i>hīndzi?i</i>	<i>fidi?</i>	<i>vàtà</i>
Lame ₃	<i>do</i>	<i>wobu</i>	<i>hinzi</i>	<i>fodi</i>	<i>war</i>
Mesme	<i>dāw</i>	<i>hòb</i>	<i>hīndi</i>	<i>fidi</i>	<i>vàtl</i>
Peve ₁	<i>dāw</i>	<i>hoòb</i>	<i>hīnji?</i>	<i>fədi?</i>	<i>vàl</i>
Peve ₂	<i>dao</i>	<i>hwōb</i>	<i>hīnji</i>	<i>fūdi</i>	<i>vātl</i>
Dari	<i>dongbá</i>	<i>hombá</i>	<i>hīnji</i>	<i>fudi</i>	<i>was</i>
Musey ₁	<i>dèw</i>	<i>bà</i>	<i>hīndi</i>	<i>fidi</i>	<i>fàl</i>
Musey ₂	<i>dèw</i>	<i>mbà</i>	<i>hīndi</i>	<i>fidi</i>	<i>vàl</i>
Musey ₃	<i>dew</i>	<i>mba</i>	<i>hīndi</i>	<i>fidi</i>	<i>fahl</i>
Marba ₁	<i>tú</i>	<i>mbà</i>	<i>hīndi</i>	<i>fidi</i>	<i>vàl</i>
Marba ₂	<i>tù</i>	<i>mbà</i>	<i>hīndi</i>	<i>fidi</i>	<i>vàl</i>
Masana	<i>kèp, tù, tùm</i>	<i>mà?</i>	<i>hīndi</i>	<i>fidi</i>	<i>vàl</i>
Masa	<i>tum</i>	<i>ma?</i>	<i>hīdi</i>	<i>fidi</i>	<i>faθ</i>
Gumay	<i>tum</i>	<i>ma?</i>	<i>hīdi</i>	<i>fidi</i>	<i>fat</i>
Bana	<i>tum</i>	<i>ma</i>	<i>hīdi</i>	<i>fidi</i>	<i>fašch</i>
Banana ₁	<i>tìyəw</i>	<i>mbà</i>	<i>yìnti(di)</i>	<i>fidi</i>	<i>fàl</i>
Banana ₂	<i>tú</i>	<i>mbà</i>	<i>hīndi</i>	<i>fidi</i>	<i>fāš</i>

Kulung	<i>turúm</i>	<i>mbá</i>	<i>hindi</i>	<i>fidi</i>	<i>waš</i>
PMasa (Shryock)			<i>*hindi</i>		<i>*val</i>
PSMasa	<i>+daw</i>	<i>+humbaw</i>		<i>*fudi</i>	
PNMasa	<i>+tu</i>	<i>+mbaw</i>		<i>*fidi</i>	

Language	6	7	8	9	10
Herdé	<i>kāngi?</i>	<i>sēdā</i>	<i>tʃhò?</i>	<i>tēfērdēw</i>	<i>gùb</i>
Lame ₁	<i>kánki</i>	<i>ší:sà</i>	<i>čóhò</i>	<i>čəfɔdɪʔò</i>	<i>g^wúbú</i>
Lame ₂	<i>kāngiāf</i>	<i>sédāɔā</i>	<i>tsóhòʔò</i>	<i>téferdāò</i>	<i>gùbù</i>
Lame ₃	<i>kanki</i>	<i>sieda</i>	<i>cióobo</i>	<i>cefodo</i>	<i>gu</i>
Mesme = Zime	<i>kāndī</i>	<i>sēdā</i>	<i>tʃhō</i>	<i>tērfādēw</i>	<i>gùb / gùp</i>
Peve ₁	<i>kánki?</i>	<i>syédá?</i>	<i>tsóho?</i>	<i>tʃɛfadew</i>	<i>gub</i>
Peve ₂	<i>kánki</i>	<i>sédā</i>	<i>tʃóhō</i>	<i>tʃɛfādēo</i>	<i>gwúb</i>
Dari	<i>kanki</i>	<i>schaeda</i>	<i>tschohó</i>	<i>téʃédō</i>	<i>gu</i>
Musey ₁	<i>kárgiyá</i>	<i>kidisiyá</i>	<i>kálvándi</i>	<i>tèŋɲè</i>	<i>dògò</i>
Musey ₂	<i>kàrgijá</i>	<i>kidizijá</i>	<i>kàlvándi</i>	<i>ʒèŋè</i>	<i>dòk / dògò</i>
Musey ₃	<i>karkiya</i>	<i>kidsiya</i>	<i>galavandi</i>	<i>hleŋe</i>	<i>doogo</i>
Marba ₁	<i>kárgéyá</i>	<i>kidiziyá</i>	<i>ʔàklávándi</i>	<i>téŋá</i>	<i>dògò</i>
Marba ₂	<i>kàragàyà</i>	<i>sidizijá</i>	<i>klávándi</i>	<i>ʒèèŋà</i>	<i>dòk / dògò</i>
Masana	<i>kàrgijá</i>	<i>sidijá</i>	<i>glávándi</i>	<i>ʒèŋè</i>	<i>dòk</i>
Masa	<i>karkia</i>	<i>sidia</i>	<i>glavandi</i>	<i>theŋe</i>	<i>dogo / doogo</i>
Gumay	<i>karkiya</i>	<i>sidiya</i>	<i>glavandi</i>	<i>tɛ:ŋe</i>	<i>dɔ:ɔ</i>
Bana	<i>kárkia</i>	<i>zidia</i>	<i>kelafánti</i>	<i>thēne</i>	<i>dògo</i>
Banana ₁	<i>kàŋgiya</i>	<i>kidisiya</i>	<i>kàlvándè</i>	<i>tìyeŋe</i>	<i>tohogò</i>
Banana ₂	<i>kárgáyá</i>	<i>kidisia</i>	<i>àkéláfándi</i>	<i>šèné</i>	<i>dògo</i>
Kulung	<i>kareia</i>	<i>kidesia</i>	<i>keláfti</i>	<i>sénga</i>	<i>dògo</i>
PMasa (Shryock)	<i>*kargi</i>	<i>*sida</i>			
PSMasa	<i>+kanki</i>	<i>+sida</i>	<i>+tsuhawɔaw</i>	<i>+tifardiʔaw</i>	<i>*gup</i>
PNMasa	<i>+karki</i>	<i>+sidiya</i>	<i>+kalavandi</i>	<i>+ʒiyaŋa</i>	<i>+dogo</i>

Bana numerals by Johannes Lukas (1937: 129).

Banana₁ numerals by Charles Kraft (1981, III: 178).

Banana₂ numerals by Johannes Lukas (1937: 134).

Dari = Weimba numerals by Kurt Strümpell (1910: 457-58).

Gumay numerals by Henry Tourneux (1977: 20-30).

Herdé numerals by Pierre Court (2008) <https://lingweb.eva.mpg.de/channumerals/Herde.htm>

Kulung numerals by Johannes Lukas (1937: 137).

Lame₁ numerals by Charles H. Kraft (1981, III: 197).

Lame₂ numerals by Michka Sachnine (1982).

Lame₃ numerals by Johannes Lukas (1937: 134).

Marba₁ numerals by Baktara Vangtou through Souleymane Kaddo (2014)

<https://lingweb.eva.mpg.de/channumerals/Marba.htm>

Marba₂ numerals by Antonino Melis <https://lingweb.eva.mpg.de/channumerals/Marba.htm>

Masa numerals by Charles Kraft (1981, III: 166).

Masana numerals by Antonio Melis <https://lingweb.eva.mpg.de/channumerals/Masana.htm>

Mesme = Zime numerals by Charles Kraft <https://lingweb.eva.mpg.de/channumerals/Mesme.htm>

Musey₁ numerals by Douna Wandu Bernard through Dr. Souleymane Kaddo

<https://lingweb.eva.mpg.de/channumerals/Musey.htm>

Musey₂ numerals by Antonino Melis <https://lingweb.eva.mpg.de/channumerals/Musey.htm>

Musey₃ numerals by Charles Kraft (1981, III: 186).

Peve₁ numerals by Lazare Wambadan through Erin Shay <https://lingweb.eva.mpg.de/channumerals/Peve.htm>

Peve₂ numerals by Charles Kraft <https://lingweb.eva.mpg.de/channumerals/Peve.htm>

Summarisation of results

	1.1	1.2	1.3	1.4	1.5	1.6
Tera						
PTera	⁺ <i>hi?arda</i>					
PHwona		⁺ <i>tital</i>				
Bura-Margi			⁺ <i>taŋ</i>	⁺ <i>tiku</i>	⁺ <i>duku</i>	⁺ <i>dzaŋaw</i>
Bana			⁺ <i>tanay</i>	⁺ <i>tix</i>		
Lamang-Mandara						
PLamang		⁺ <i>tala</i>		⁺ <i>tik^wi</i>		
PMandara						
PPodokwo				⁺ <i>k^witir?</i>		
Mafa-Mada						
PMuktele				⁺ <i>tik^w-ila</i>		
PZelgwa						
PMafa						
PMefeŋe						
PMada				⁺ <i>fi-tik</i>		
PMofu				⁺ <i>tik^w</i>		
PMbuko				⁺ <i>-tik^w</i>		
PHurzo						
PMarwa						
PUldeme						
Sukur						
Daba				⁺ <i>takan</i>		
Bata	⁺ <i>hidaw</i>					Gudu <i>jəŋ</i>
Gidar-Musgu						
PGidar				⁺ <i>takay</i>		
PMusgu						
Muskum					⁺ <i>diga</i>	

Kotoko						
PNKotoko				<i>+tik</i>		
PCKotoko				<i>+tiku</i>		
PIsland Kotoko						
PSKotoko						
Masa						
SMasa						
NMasa						
Notes				CCh <i>+tik-aw/-ay</i> cf. ECu <i>*tak-kaw / -ta(y)</i> NOM: Kafa <i>tokki / tok</i> together with		

	1.7	1.8	1.9	1.10	1.11	1.12
Tera						
PTera						
PHwona						
Bura-Margi	<i>+patu</i>					
Bana	<i>+palaw</i>	<i>+lim</i>				
Lamang-Mandara						
PLamang	<i>+palaw</i>		<i>+din</i>			
PMandara	<i>+palaw</i>					
PPodokwo						
Mafa-Mada						
PMuktele						
PZelgwa				<i>+ʔilik</i>		
PMafa						<i>+sitad'</i>
PMefele						
PMada						
PMofu	<i>+pal</i>					
PMbuko						
PHurzo						
PMarwa	<i>+pal</i>		<i>+den</i>		<i>+bilay</i>	
PUldeme					<i>+bila</i>	
Sukur				<i>+kili</i>		
Daba						
Bata						

Gidar-Musgu						
PGidar						
PMusgu						
Kotoko						
PNKotoko	⁺ <i>pal</i>					
PCKotoko					⁺ <i>bal</i>	
PIsland Kotoko						
PSKotoko						
Masa						
SMasa						
NMasa						
Notes	cf. CCu: Awngi <i>əmpál</i> 1; but cf. also Saharan: Kanuri <i>fal</i> 1			cf. Maban: Maba <i>illek</i> 'that one'	cf. CSud: Gbaya <i>būlā</i> 1	cf. ECh: Mokulu <i>sóo</i> 1 Om <i>*ʔis-</i> 1 Sem <i>*ʕaštay-</i> 1

	1.13.	1.14.	1.15.	1.16.	1.17.	1.18.
Tera						
PTera						
PHwona						
Bura-Margi						
Bana						
Lamang-Mandara						
PLamang						
PMandara						
PPodokwo						
Mafa-Mada						
PMuktele						
PZelgwa						
PMafa						
PMefele	⁺ <i>(ʔa)mita</i>					
PMada						
PMofu						
PMbuko						
PHurzo						
PMarwa		⁺ <i>sala</i>				
PUldeme		⁺ <i>šeleŋ</i>				
Sukur						

Daba			⁺ <i>ntad</i>			
Bata						
Gidar-Musgu						
PGidar						
PMusgu				⁺ <i>daway</i>	⁺ <i>tay</i>	
Kotoko						
PNKotoko					⁺ <i>tay</i>	
PCKotoko						⁺ <i>tsi-γidiya</i>
PIsland Kotoko					⁺ <i>kittay</i>	
PSKotoko						⁺ <i>tsiya</i>
Masa						
PSMasa				⁺ <i>daw</i>		
PNMasa					⁺ <i>tu</i> < ⁺ <i>tiyaw</i>	
Notes	ECu <i>*mat-/*mit-</i> 1 Om: Gimira <i>*maɬ-</i> 1; cf. Kafa <i>mittoo</i> sole			cf. HsGw ⁺ <i>daya</i> 1; CSud: Lutos <i>dóí</i> 1 Kaba Deme <i>díyá</i>		

	2.1	2.2	2.3	2.4	2.5	3.1	4.1
Tera							⁺ <i>fʷad</i>
PTera	⁺ <i>rap</i>					⁺ <i>kunu</i>	
PHwona		<i>*sirri</i>				<i>*mahkan</i>	
Bura-Margi		⁺ <i>sidayaw</i>		⁺ <i>mitu</i>		⁺ <i>maakiru</i>	<i>*fʷadu</i>
Bana		⁺ <i>sul</i>			⁺ <i>biwaku</i>	<i>*maxkin</i>	⁺ <i>fʷadî</i>
Lamang-Mandara							
PLamang		⁺ <i>hisira</i>				<i>*hikina</i>	<i>*wifad</i>
PMandara				⁺ <i>mitsay</i>	<i>*biwa</i>	⁺ <i>hikirda</i>	<i>*ʔufadî</i>
PPodokwo		⁺ <i>ʔisira</i>				⁺ <i>makira</i>	⁺ <i>ʔufada</i>
Mafa-Mada							
PMuktele		⁺ <i>sila</i>				⁺ <i>makir</i>	⁺ <i>ʔufad</i>
PZelgwa		⁺ <i>silaw</i>				⁺ <i>makir</i>	⁺ <i>ʔifad</i>
PMafa			⁺ <i>tsaw</i>			<i>*mahkar</i>	<i>*fad</i>
PMefele			⁺ <i>(ts)atsaw</i>			<i>*mahkar</i>	⁺ <i>fʷaad</i>
PMada		⁺ <i>sila</i>				⁺ <i>mahkar</i>	⁺ <i>wifad</i>
PMofu		<i>*siwla</i>				<i>*mahkir</i>	<i>*wifad</i>
PMbuko			<i>*tsaw</i>			<i>*maakan</i>	<i>*fudaw</i>
PHurzo			⁺ <i>tsiyaw</i>			⁺ <i>mangan</i>	⁺ <i>fuwdaw</i>
PMarwa			<i>*tsiw</i>			<i>*maakaj</i>	<i>*mufad</i>

Puldeme			⁺ <i>biri-tsiw</i>		⁺ <i>biri-tsiw</i>	⁺ <i>makar</i>	⁺ <i>mifad</i>
Sukur					[*] <i>bak</i>	⁺ <i>makin</i>	[*] <i>fwad</i>
Daba		[*] <i>siraj</i>			[*] <i>bik</i>	[*] <i>mahkad</i>	⁺ <i>mifwad</i>
Bata					⁺ <i>biryak</i>	[*] <i>mahikin</i>	[*] <i>fwad</i>
Gidar-Musgu							
PGidar		[*] <i>siwla</i>				⁺ <i>haku</i> ^{n?}	[*] <i>pada</i> ^w
PMusgu		[*] <i>sili</i>				⁺ <i>ɔuhu</i> ^{n?}	[*] <i>pidi</i> ^w
Muskum		⁺ <i>hilyu?</i>				⁺ <i>hugaŋ?</i>	⁺ <i>fudi</i>
Kotoko							⁺ <i>ka-fday</i>
PNKotoko		[*] <i>gasi</i>				⁺ <i>gakiraw</i>	⁺ <i>gaday</i>
PCKotoko		[*] <i>xisa</i>				⁺ <i>kaxikir</i>	⁺ <i>gaday</i>
Plsland Kotoko		[*] <i>kihi</i>				⁺ <i>kakinmay</i>	⁺ <i>higay</i>
PSKotoko			[*] <i>tsu</i>			⁺ <i>xik</i> ^w <i>an</i>	[*] <i>fodi</i>
Masa						[*] <i>hindi</i>	
PSMasa					⁺ <i>humbaw</i>		⁺ <i>fudi</i>
PNMasa					⁺ <i>mbaw</i>		[*] <i>fidi</i>
Notes	cf. BTg ⁺ <i>rap</i> NBc ⁺ <i>rabu</i> SBc ⁺ <i>rwap</i> ECh: Mawa <i>rap</i> 2; Jarawa <i>rwap</i> 2	CCh [*] <i>siwra</i> < PCh ⁺ <i>ciraw</i> 2; cf. SCu [*] <i>tsada</i> 2 ECu: Arb <i>sada</i> Yaaku ç	CCh [*] <i>tsijiw</i> ; cf. Sah: Daza <i>čú</i> ; Teda <i>cú</i> ; Zagh <i>súyi</i> Bideyat <i>sui</i> Berti <i>su</i> 2	cf. ECh Sokoro <i>môdû</i> 2 Ubi <i>mudu</i>	cf. Jrw Bantu ⁺ <i>bari</i> 2 NS: Maban ⁺ <i>mbar</i> 2	CCh [*] <i>hikin</i> PCh ⁺ <i>kanu</i> cf. PSOm [*] <i>makkan</i> 3?	CCh [*] <i>wipad</i> < PCh ⁺ <i>fwad</i> < ⁺ <i>far(i)du</i> ; Beja <i>fadig</i> / <i>farig</i> 4 ECu [?] <i>afur-</i> / [?] <i>affar-</i> 4 POm [?] <i>awurd-</i> 4 Egyptian <i>fd-w/-t</i> 4 < [*] <i>fida</i> 3wat

	5.1	5.2	5.3	5.4	5.5	5.6	5.7
Tera							
PTera	[*] <i>dirman</i>						
PHwona		⁺ <i>tif</i> ^o					
Bura-Margi		[*] <i>tif</i> ^w					
Bana		⁺ <i>mitsifî</i>					
Lamang-Mandara							
PLamang		[*] <i>h^witaf</i>					
PMandara				⁺ <i>ɔiɓiɓa</i>			
PPodokwo			⁺ <i>ɓama</i>				

Mafa-Mada							
PMuktele				⁺ <i>ɓiw</i>			
PZelgwa			⁺ <i>ɓiɓam</i>				
PMafa			<i>*ɓam</i>				
PMefele			⁺ <i>ɓam</i>				
PMada			⁺ <i>ɓam</i>				
PMofu			<i>*ɓim</i>				
PMbuko	⁺ <i>dara(m)</i>						
PHurzo	⁺ <i>dara</i>						
PMarwa			<i>*ɓi^wdam</i>				
PULDeme			⁺ <i>ɓam</i>				
Sukur			<i>*ɓam</i>				
Daba					<i>*dzabɪn</i>		
Bata		<i>*tiɓ^w</i>					
Gidar-Musgu							
PGidar			<i>*la?</i>				
PMusgu			<i>*ɓiɓim</i>				
Muskum						⁺ <i>hiray</i>	
Kotoko			<i>*lentsi</i>				
PNKotoko			<i>*l^hentsi</i>				
PCKotoko			<i>*ɓeɓi</i>				
PIsland Kotoko			⁺ <i>hinɓi</i>				
PSKotoko						⁺ <i>xihray</i>	
Masa							<i>*val</i>
PSMasa							
PNMasa							
Notes		CCh <i>*h^witɪf</i> ; WCh <i>*tafa</i> palm of hand; Sokoro <i>tafa</i> ; CCu: Awngi <i>tafa</i> hand	CCh <i>*ɓidɪm</i> < <i>*ɓimi-d</i> & <i>*lensi</i> < ⁺ <i>semi(S)</i> ; cf. Berb <i>*sammūs</i> 5		cf. CCh <i>*dzivɪ^w</i> arm; or Adm: Pana <i>ndibi</i> 5 Mambai <i>bizépè</i> 5	cf. CCh <i>*hira</i> arm, hand cf. WCh: Ron ⁺ <i>haRa</i> 5	WCh <i>*bV-baçu</i> ECh <i>*baɓyaw</i> 5

	6.1 = 3+3	6.2 = 2x3	6.3 = (5)+1 or 5+(1)?	7.1 = 3+4?	7.2 = (5)+2?
Tera				⁺ <i>midu</i>	
PTera	⁺ <i>nyoy</i>				
PHwona	⁺ <i>miki</i>		Boka <i>tyèxxel</i>		
Bura-Margi	⁺ <i>ɲk^wa</i>			[*] <i>midɨfaw</i>	
Bana	⁺ <i>ɲk^waŋ</i>			[*] <i>mbirfɨŋ</i>	
Lamang-Mandara					
PLamang	[*] <i>mkiwa</i>			⁺ <i>rdfaŋ</i>	
PMandara	[*] <i>mikiwah</i>			[*] <i>midɨfi</i>	⁺ <i>vabiwa</i>
PPodokwo	⁺ <i>mikiwa</i>			⁺ <i>madifa</i>	
Mafa-Mada					
PMuktele	⁺ <i>muk^wa</i>			⁺ <i>midif</i>	
PZelgwa			⁺ <i>ndilik</i>		⁺ <i>tisila</i>
PMafa	[*] <i>mak^wa</i>				[*] <i>tsarad</i>
PMefele	⁺ <i>mik^wa</i>				⁺ <i>tisilad</i>
PMada	⁺ <i>mik^waw</i>				⁺ <i>lasila</i>
PMofu	[*] <i>mik^waw</i>				[*] <i>tasila</i>
PMbuko	[*] <i>marka</i>				⁺ <i>tsiwbay</i>
PHurzo	⁺ <i>marka</i>				⁺ <i>tsiwbay</i>
PMarwa	[*] <i>markid</i>				
PUldeme	⁺ <i>mik^waw</i>				⁺ <i>sisila</i>
Sukur	[*] <i>mik^wa</i>			[*] <i>madaf</i>	
Daba	⁺ <i>ɲk^wah</i>				⁺ <i>tsasirad</i>
Bata	[*] <i>kiwa</i>		⁺ <i>tuk^wil-taka</i>	[*] <i>midɨfɨŋ</i>	⁺ <i>tuk^wil- -bi[ry]ak</i>
Gidar-Musgu					
PGidar				[*] <i>lira</i>	⁺ <i>busiwla</i>
PMusgu				[*] <i>lira</i>	⁺ <i>mukizak</i>
Muskum			⁺ <i>hiray-diga</i>	⁺ <i>maadi</i>	
Kotoko					
PNKotoko		[*] <i>vinahkir</i>	⁺ <i>l'entsi-ka-tay</i>		
PCKotoko		[*] <i>vinahkir</i>			
PIsland Kotoko					
PSKotoko			⁺ <i>xihray-kim- -tsiya</i>		⁺ <i>xihray-kim-tsu</i>
Masa					
PSMasa	⁺ <i>kanki</i>				⁺ <i>sida</i>
PNMasa	⁺ <i>karki</i>				⁺ <i>sidiya</i>

Notes	+ <i>(mi-)</i> <i>k^wan-</i> <i>k^wan <</i> + <i>(mi-)</i> <i>kanu-kanu</i>					+ <i>mifidīkn</i> < + <i>mi-fadī-</i> <i>kanu</i> 4+3; cf. WCh: SBc: Dott <i>wúsúr-</i> <i>maakó</i> 7 = <i>wópsi</i> 4 + <i>maakó</i> 3 ECh: Ndam <i>wosubo</i> 7 = <i>woro</i> 4 + <i>supu</i> 3	cf. CCh <i>*tasīrad</i>
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	7.3	7.4	8.1 = 4+4	8.2 = ? 4	8.3	8.4 = (10)-2	8.5 = (5)+3
Tera							
PTera						+ <i>miyasīri</i>	
PHwona			+ <i>f^wadf^wad</i>				
Bura-Margi						<i>*tsⁱisiw</i>	
Bana					<i>*tiyis</i>		
Lamang-Mandara					<i>*tiyis</i>		
PLamang							
PMandara							
PPodokwo						+ <i>izza</i> < <i>*isira dzim</i> 10-2?	
Mafa-Mada							
PMuktele					+ <i>mitigiš</i>		
PZelgwa							+ <i>tsamakir</i>
PMafa							+ <i>tsamakard</i>
PMefele							+ <i>tsahkar</i>
PMada							+ <i>lalahkar</i>
PMofu				+ <i>dangafad</i>			
PMbuko			+ <i>nifudaw-</i> <i>fudaw</i>				
PHurzo						+ <i>dzi[ms]iray</i>	
PMarwa	+ <i>tarna</i>			+ <i>dangafad</i>		Bald <i>sàabùr</i>	
PUldeme			+ <i>fadfad</i>				
Sukur					<i>*tiyis</i>		

Daba			⁺ <i>fadfad</i> ⁺ <i>tsifad̥si-</i> <i>fad̥</i>				⁺ <i>dzamahkad̥</i>
Bata		⁺ <i>miskata</i>	⁺ <i>fʷad̥fʷad̥</i>		<i>*tiyis</i>		
Gidar-Musgu							
PGidar					⁺ <i>muti[ɣ]iʃ</i>		
PMusgu				⁺ <i>dadapadaʷ</i>		⁺ <i>musilay</i>	
Muskum							⁺ <i>haasgaŋ</i>
Kotoko							
PNKotoko			⁺ <i>gad̥ay-</i> <i>gad̥ay</i>				
PCKotoko				⁺ <i>vinagad̥ay</i>			
PIsland Kotoko							
PSKotoko			⁺ <i>fod̥afod̥ay</i>	⁺ <i>dzaŋ fod̥i</i>			
Masa							
PSMasa						⁺ <i>tsuhawʔawʔ</i>	
PNMasa				⁺ <i>kalavand̥iʔ</i>			
Notes	cf. Adm: Mam- bai <i>tàrnáǵà</i> 7	cf. CSud: Kaba Na <i>mitákǵǵà</i> 7		cf. WCh: Ngizim <i>dándà-fǵdū</i> 8	CCh <i>*tiyis</i> cf. HsGw <i>*takwasi</i> < <i>*biyat-</i> <i>akwan-si</i> 5 + 3		

	9.1 = (5)+4	9.2 = (10)-1	9.3	9.4	9.5	9.6
Tera						
PTera			⁺ <i>miǵam</i>			
PHwona	⁺ <i>fʷad̥ d̥irman</i>	⁺ <i>gway-ha-hiʔarda</i>				
Bura-Margi			⁺ <i>miǵaw</i>			
Bana			⁺ <i>miǵi</i>			
Lamang-Mandara						
PLamang	⁺ <i>timbad̥ay</i>					
PMandara	⁺ <i>visulimbad̥ay</i>			⁺ <i>masil-manay</i>		
PPodoko		⁺ <i>matirtsay</i>				
Mafa-Mada						
PMuktele		⁺ <i>ladiga</i>				
PZelgwa	⁺ <i>tsuwid̥</i>					
PMafa	⁺ <i>tsuwad̥</i>					
PMefele	⁺ <i>tsiwd̥</i>					

PMada						⁺ ʔa ^m bu- lumbaw	
PMofu	⁺ tsufwad						
PMbuko	⁺ disuwɔaw						
PHurzo		⁺ tahkay					
PMarwa		⁺ gwaltir Bald zàá.bə̀là					
PUldeme						⁺ ʔalbit	
Sukur				⁺ mili			
Daba	⁺ dza[ma ²]fad	⁺ dirfatakan					
Bata	⁺ tambidaw						⁺ ʔilɓij
Gidar-Musgu							
PGidar		⁺ vaytak					
PMusgu		⁺ tikila					⁺ ɓiyanyay
Muskum	⁺ hirayfuɗi						
Kotoko							
PNKotoko		⁺ inu tay finger 1 ⁺ taya inaw 1 finger					
PCKotoko		⁺ inu tiku finger 1					
PIsland Kotoko							
PSKotoko		⁺ tsiya ... (minus 1)					
Masa							
PSMasa	⁺ tifardiɔaw						
PNMasa							⁺ ɓiyana

	10.1	10.2	10.3	10.4	10.5	10.6	10.7
Tera							
PTera	⁺ gwanj						
PHwona		*k ^{wi} m					
Bura-Margi		*k ^{wi} ima					
Bana	*g ^{wi} m						
Lamang-Mandara							
PLamang	*y ^{waj}						
PMandara				*kilawa			
PPodokwo			⁺ dzim				
Mafa-Mada							
PMuktele				⁺ kulaw			

PZelgwa				⁺ <i>kuraw</i>			
PMafa				[*] <i>k^wiraw</i>			
PMefe			⁺ <i>dimbaku</i>				
PMada			⁺ <i>dzumik^w</i>				
PMofu				[*] <i>kiraw</i>			
PMbuko				⁺ <i>kuraw</i>			
PHurzo			⁺ <i>dzim</i>				
PMarwa				[*] <i>kiri^w</i>			
PULDeme				⁺ <i>k^wilaw</i>			
Sukur	[*] <i>waj</i>						
Daba	⁺ <i>wam</i>				⁺ <i>gub</i>		
Bata					⁺ <i>[g]paw</i>		
Gidar-Musgu							
PGidar				⁺ <i>kilaw</i>			
PMusgu						⁺ <i>dogo</i>	
Muskum	<i>gum</i> ^{Röder}			⁺ <i>kuru</i>			
Kotoko							
PNKotoko		[*] <i>kan</i>					
PCKotoko		[*] <i>hikan</i>					
Pisland Kotoko		[*] <i>hikan</i>					
PSKotoko							⁺ <i>libaku</i>
Masa							
PSMasa					[*] <i>gup</i>		
PNMasa						⁺ <i>dogo</i>	
Notes	cf. WCh ⁺ <i>guma</i> 10	cf. ECh: Mawa <i>k^va:yan</i> Mokulu <i>kòomá</i> 10	cf. Adm: Mundang <i>zémà</i> 10	CCh [*] <i>kiriw</i> ; cf. ECh ⁺ <i>kuraw</i> ; WCh: Ron: Bokkos <i>hùrè</i> 10; ECu [*] <i>kurḍan-</i>	cf. CSud ⁺ <i>kpuu</i> 10	cf. ECh: Sarwa <i>doko</i> 10; CSud ⁺ <i>dogo</i> 10	

Note: The symbol ⁺ indicates the preliminary reconstructions representing an intuitive ‘common denominator’, while the traditional asterisk ^{*} is used for standard reconstructions based on regular sound correspondences; in the case of Central Chadic these reconstructions follow Richard Gravina.

Abbreviations: Adm Adamawa; Arb Arbore; B Bole; Bald Baldamu; Bc Bauchi; C Central; Ch Chadic; Cu Cushitic; E East; Gw Gwandara; Hs Hausa; Jrw Jarawan; Kan Kanuri; M-M Mafa-Mada; N North; NS Nilo-Saharan; Om Omotic; P Proto-; S South; Sah Saharan; Sem Semitic; Sud Sudanic; Tg Tangale; W West; Zagh Zaghawa.

Conclusion

Taking in account the external cognates in other Afroasiatic branches (see Blažek 1991, 1999, 2017, 2018a, 2018b), the following Central Chadic numerals of the first decad should be determined as inherited:

§1.4. CCh ⁺*tik-aw/-ay*; besides §1.12 PMafa ⁺*sítad*; §1.13. PMefele ⁺(?*a*)*míta*;

§2.2. CCh ^{*}*síwra* < PCh ⁺*ciraw*;

§3.1. CCh ^{*}*hikin* < PCh ⁺*kanu*;

§4.1. CCh ^{*}*wipad* < PCh ⁺*fwadî* < ⁺*far(i)du*;

§5.3. CCh ⁺*šemi(S)*;

10.4. CCh ^{*}*kiríw* < PCh ⁺*kuraw*.

The numerals ‘6’, ‘7’, ‘8’, ‘9’ are analyzable as results of various arithmetic operations:

6 = 3 + 3 ... §6.1. This pattern looks as the most frequent one for the numeral ‘6’.

6 = 2 x 3 ... §6.2.

6 = (5) + 1 or 5 + (1) ... §6.3.

7 = 3 + 4 ... §7.1.

7 = (5) + 2 ... §7.2.

8 = 4 + 4 ... §8.1. This pattern looks as the most frequent one for the numeral ‘8’.

8 = ? + 4 or ? x 4 ... §8.2.

8 = (10) – 2 ... §8.4.

8 = (5) + 3 ... §8.5.

9 = (5) + 4 or 4 + 5 ... §9.1.

9 = (10) – 1 ... §9.2.

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The Polish Catholic Church on the life of Poles at the beginning of the millennium: A corpus-assisted Critical Discourse Analysis

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Abstract: The Catholic Church plays a vital role in Polish public life, strengthened only by the political change, which brought to power the right-wing conservative Law and Justice party. This role could be seen as a reflection of Poland's religious landscape. Yet, it is accepted only in restricted domains of life: while 61% of people accept the Church taking the stance in matters of morality, 55% disapprove of the Church voicing opinions about the Parliament's bills (CBOS 2013).

This study aims to analyse which of these domains are represented in the corpus of official documents of the Polish Catholic Church (241 000 words, 259 documents). To achieve this aim, the study, situated within the corpus-supported Critical Discourse Analysis paradigm (van Dijk 1993, Baker 2006), combines collocation and concordance analysis methods.

The findings reveal the presence of both religious and secular dimensions, although in different manners. The former has a rather individual character, whereas the latter concerns public life. Overall, the results support the view of the Polish Catholic Church as an administrator of values (Graff 2010) and point to the great self-involvement of the Church.

Keywords: Catholic Church in Poland, religion in Poland, Polish Catholicism, Critical Discourse Analysis, Corpus-Assisted Discourse Studies

Introduction

Mounting research points to the central role of the Catholic Church in political and social life in Poland (e.g. Graff 2010, Heinen & Portet 2010, Mandes 2020). The vast majority of Poles declare to be Catholic as there is an inherent relationship between national identity and Catholicism, i.e. the Church played an important role in the struggle for Poland's independence and (as a result) has considerable influence on the political scene. This is merely a fraction of the arguments confirming the social significance of the Catholic Church. However, arguments to the contrary have recently started to emerge

and take shape. These include the permanent social disapproval of political involvement on the part of Church officials, accompanied by the belief that the far-reaching influence on political life by this social group is unacceptable (Grabowska 2022b). Moreover, the vast majority of Poles perceive religion to be an aspect of their lives to be confined to the private sphere. This gives rise to the question how the institutionalised Polish Catholic Church positions itself toward Poles' lives. Does it restrict itself in its statements to guidelines concerning their religious and spiritual life? Does it take on the role of an authority in matters concerning the private lives of its believers? If speaking on social and political issues, what discursive identity does the Catholic church assume: a commentator explaining to the faithful the current social and political life from the perspective of faith and its dogmas? A critic who points out actions inconsistent with the morality adopted within the Catholic doctrine? An authority whose right is to require and impose certain actions in the secular domain? These broad questions have inspired the corpus-assisted analysis of official documents of the Polish Bishops' Conference presented in this paper.

Social and political role of the Polish Church

Several metrics of religiousness indicate the fundamental role of Catholicism in Poland. According to the census from 2011, 96 per cent of people who answered the question about their religion chose the Roman Catholic faith (88 per cent of the total population) (GUS 2011). This trend is also confirmed by more recent data collected by the Public Opinion Research Centre (Centrum Badania Opinii Społecznej, CBOS): 'Our systematic research shows that since the end of the nineties, more than 90 per cent of those surveyed (92 - 97 per cent) have invariably considered themselves as believers'¹ (Boguszewski 2017a) and mirrored in results of the International Social Survey Programme ISSP 2008 – Religion III 2008 (86 per cent) (ISSP Research Group 2018). Also, data on participation in services reflects such declarations. According to ISSP, nearly 35 per cent of Poles attend a service at least once a week (ISSP Research Group 2018). Also, data on participation in services reflects such declarations. According to data collected by the CBOS, nearly 40 per cent of Poles attend a service at least once a week (CBOS 2022), while observations carried out by the Institute of Catholic Church Statistics (Instytut Statystyki Kościoła Katolickiego, ISKK) put this percentage at the approximate level of 37 per cent (ISKK 2020). This puts Poland among other traditionally Catholic countries in Europe such as Ireland (87 per cent Catholics, 44 per cent attending at least once a week), Italy (89 per cent Catholics, 22 per cent attending) and Spain (75 per cent Catholics, 20 per cent attending) (ISSP Research Group, 2018). Life's landmark events' celebration also take the Catholic form: 98 per cent of children born in 2016 were baptised, 62 per cent of weddings in Poland were held in the Catholic Church². As a result, Catholicism seems to be widespread in Poland at the level of declarations

¹ All translations from Polish publications and other Polish texts are provided by the author.

² Due to the Concordat from 1993 Church wedding is recognized by the state.

as well as religious practices, both in everyday life and on festive occasions. The commonness of declarations of faith may attribute the Church the legitimacy for statements about the lives of all Poles, not excluding ones outside this religious community. Furthermore, the commonness of religious practices can sanction statements concerning various spheres of their lives, not limited to spiritual or religious life.

The important role of Catholicism in the life of Poles is also evidenced by its connection with national identity. Over 80 per cent of Poles positively assess the impact of Polish baptism on both the Polish statehood and the Polish culture (Boguszewski 2016). This percentage varies only slightly throughout the political spectrum; therefore, we may assume that most Poles are satisfied with the fact that they live in a Catholic country. This is also reflected in the discursive construction of the Pole-Catholic identity. In communist times, it was one of the most important parts of the Catholic Church's self-characteristics (Kominek 2003). As Kominek (2003) puts it: "The result of this permanent connection [between nation and Catholicism, VK] was in the past the formula of the Pole-Catholic, which almost put these two concepts on a par with each other". The political transformation has not brought about any significant changes in this respect. Skowronek (2006) shows a similar connection between being Polish and being Catholic within a dataset of contemporary pastoral letters. Moreover, Makuchowska (2011) draws our attention to the strengthening of the image of non-Catholics as enemies of the nation, Christianity, and the Church after the political transformation of 1989. This clear discursive connection between national and religious identities may lead to discursive statements concerning the life of the nation, i.e. not only the private life of the faithful but also – more broadly – the social or political life in Poland.

The critical role of the Catholic Church in the post-war history of Poland is hardly questionable. During the communist era (1945-1989) its crucial position was recognised by all important social actors: the ruling communist party and the opposition. Moreover, the Church was well aware of this. Fighting against this powerful institution became one of the most important goals of the communist party, which was carried out by various means, beginning with anti-church propaganda, through surveillance of the clergy and Catholic activists, closing Catholic schools, to the detention and imprisonment of priests and monks. One of the most dramatic manifestations of the party's struggle with the Church was the arrest and detention of the Primate of Poland, Cardinal Stefan Wyszyński in 1955, and the brutal assassination of Father Jerzy Popiełuszko by Security Service agents in 1984 (Skowronek 2006). What is more, for members of the opposition, churches were often a place of refuge from the oppressive communist reality. It was there that they had the opportunity to express their anti-communist sentiments freely. Masses often turned into demonstrations of patriotism and national solidarity (Skowronek 2006). The analysis of Solidarity movement documents carried out by Kominek (2003) also presents the discursive dimension of this connection between Catholicism and patriotism: in these documents the Catholic Church and the Polish nation are seen as an undivided unity. Such historical conditions may reinforce the aforementioned tendency for the Church representatives to comment on social and political life in Poland, as well as indicate that they adopt the position of active authorities or critics rather than passive observers.

The political transformation of 1989 fundamentally changed the situation of the Catholic Church in Poland. On the one hand, it was allowed to organize public religious events on a large scale; it was also granted unrestricted symbolic rights to take a stand on social and political issues. On the other hand, the freedom of speech, which was part of the democratic transformation, made the Church a subject of open criticism (Kominek 2003). According to many researchers, these changes have not led to a weakening of the role of the Catholic Church in social and political life in Poland but even strengthened it. The Church has become present in the public space. This can be exemplified by, for instance, hanging Christian crosses in public places (including the Parliament), the presence of the Church's officials during the celebration of all important public holidays, religion taught in state-run schools and financed from the state budget or, finally, the inclusion of Christian values in the constitution (Graff 2010). The institution's political influence has also increased significantly: Heinen indicates that many political decisions are motivated by the politicians' fear of losing the support of, what they consider to be, the most numerous social group, the Catholics (Heinen & Portet 2010). Borowik (2002) describes the attempts of the Catholic Church to influence the results of elections and Graff (2003) suggests the debate on antiabortion law as an example of "the power of the Church to upset the democratic process itself, and the willingness of the political elite to give in to the pressure of clergy" (Graff 2003: 112). The scope of the Church's political impact is also reflected in legal solutions adopted in Poland, such as the criminalisation of abortion (Zielinska 2000; Owczarzak 2009) against the will of the majority of voters (Graff 2003), severe restrictions on family planning services (Mishtal & Dannefer 2010) or the Conscience Clause law allowing medical practitioners to refuse health services because of conscience-based objections (Mishtal 2009). The influence of the Church on education in Poland is also visible, among others, through religious education as part of the curriculum in Polish schools (Heinen 2010) and influence on the content of 'Preparation for Life in a Family' courses (Mishtal & Dannefer 2010; Heinen & Portet 2010; Pakuła et al. 2015).

Religion as a private matter

High religious indicators are not accompanied by the acceptance of the Church's involvement in social and especially political life. The lack of acceptance remains as constant as declarations of faith or participation in religious practices. As early as by the end of the 1980s, more than half of Poles did not accept the Church's representatives' comments on political issues (Mariański 1993). The political transformation did not change this situation. At the beginning of the 1990s, the majority of Poles (61 per cent) supported the complete separation of the state and the Church (Mariański 1993), and nearly half declared that the Church should not influence socially important decisions concerning areas other than faith and religion (Mariański 1993). This lack of acceptance is even more evident when the Church attempts to exert direct influence on elections. In 2013, more than 4/5 (82 per cent) of Poles felt outraged by priests actively and publicly (also during services) supporting specific political parties. This percentage has also stayed

unchanged since the beginning of this millennium (Grabowska 2022b). The reluctance to listen to the Church's opinion on electoral issues is also reflected in the sphere of individual decisions: in the late 1990s, more than half of Poles (58 per cent) considered that a Catholic could vote for a non-believer candidate (Adamczuk 2001), while in 1995 and again in 2000, Aleksander Kwaśniewski openly declaring himself a non-believer was elected president. Given these statistical data, one can reasonably expect the Church to focus on the private sphere in the discursive construction of life.

Over the last two decades, the Church's involvement in political life in Poland has consistently been assessed as direct or even unacceptable. Thus, at the beginning of the 1990s, nearly two-thirds of Poles (64 per cent) noticed the influence of the Church on politics and politicians, assessing it as significant or decisive (Mariański 1993). The next decade does not substantially change this assessment: in 2001, two-thirds of Poles (66 per cent) still noticed the involvement of the Church in politics (Adamczuk 2001). Moreover, as early as in the early 1990s, more than 2/3 of Poles (67 per cent) considered the influence of the Church on public life in Poland as too far-reaching (Mariański 1993). The next decade witnessed only a slight change in this assessment since it decreased to 60 per cent in 2006 (Mariański 2011), and in 2007, nearly half of Poles (49.6 per cent) indicated that the influence of the Church on the life of the country should be less significant (Mariański 2011). Moreover, the political involvement of the Church is perceived not only as something uncalled for but even as one of the fundamental issues internal to the Church in Poland: in 2019, over 1/3 of Poles identified the involvement of the Church in politics as one of the main problems of the Church. It takes second place after the uncovered cases of paedophilia indicated by 60 per cent of the respondents (Głowacki 2019). Such a negative assessment of the Church's involvement in politics might suggest that its discourse will tend to avoid statements about social and, in particular, political life.

Not only do Poles oppose the Church to being involved in political life, but they also treat religion as a private sphere of their lives, reserved only for themselves or for the people closest to them. For example, conversations on religious matters are held only in the closest family circles: 43 per cent of Poles declare that they avoid such conversations at work or in educational settings, and 27 per cent even in conversations with friends (Zaręba 2010). Putting religion in the private sphere is also indicated by the belief that education in a state-run school should be based only on norms and values stemming from general humanism relying on common principles, and recognised both by believers and non-believers. Only one in six believes that it should be based on the ethics of the Catholic Church (Boguszewski 2017b). The privacy of religion among Polish Catholics is also reflected in the separation of moral norms from religiousness. Nearly 70 per cent of respondents are of the opinion that what good and evil should be primarily a personal matter for every human being, and only 15 per cent believe that this should be primarily dictated by God's laws (Boguszewski 2017b). As many as 1/3 of Poles do not accept the Church's statements on moral issues (Grabowska 2013). Catholic sexual morality, of which a large number of Catholics remain critical, seems to be a particularly sensitive area. At the same time, the Church's interference in the sphere of sexuality is considered to be overly extensive and intrusive (Baniak 2007). Such views of Polish

Catholics suggest that the discourse of the Catholic Church might focus only on the religious life of its followers.

The tension arising from the discussed research concerns the functioning of the Church in the social sphere. There is also a clear variation in the level of social acceptance of this role, due to the domains concerned. Moreover, there is no doubt that the Catholic Church is present in the religious life of Poles, as evidenced by the high rates of religious practice. However, its involvement in the private lives of Poles is perceived more ambiguously. On the one hand, they commemorate the most important events of their lives through religious celebrations (e.g. weddings). On the other hand, though, they object when the Church interferes in the sphere of their morality or sexual life. When it comes to social life, we are dealing with the acceptance of the broad presence of the Church in public life and a firm disagreement with its involvement in politics. From the perspective of this ambivalence, the question about the role of the Church per se in relation to these three domains is interesting. In this article, I will therefore focus on addressing the following research questions:

1. How does the Catholic Church position itself discursively in relation to the religious life of Poles?
2. How does the Catholic Church position itself discursively in relation to the private life of Poles?
3. How does the Catholic Church position itself discursively in relation to issues of social and political life in Poland?

These questions are approached from the perspective of Critical Discourse Analysis (CDA), understood as “a form of academic inquiry which aims to achieve a better understanding of how societies work” (Baker & McEnery 2005). I consider the institutional Polish Catholic Church as a powerful agent within society. I aim to explore how its discourse legitimizes and reinforces this power and to understand in which domains of life this process occurs.

Methods and materials

Corpus

The corpus analysed in this study comprises all documents published on the website of the Polish Bishops' Conference (Konferencja Episkopatu Polski, KEP). The choice of documents from this institution is based on the belief that they most accurately represent the official discourse of the institutional Catholic Church in Poland. The Polish Episcopal Commission is “a permanent institution established by the Holy See (..)” (KEP 2009), and its tasks include overseeing the religious and moral life of Catholics in the state, as well as maintaining proper relations between the Church and the State (KEP 2009). I, therefore, recognise this institution as representative of the Catholic Church in Poland as a whole and also speaks on its behalf. Such an approach to the selection of data can be defined, as Bednarek (2008) suggests, as a semi-automatic analysis of medium-size corpora, which limits the size of the corpus to a volume that allows a manual analysis

of its selected aspects. This permits the use of qualitative techniques and therefore a more complete reconstruction of the discourses under investigation.

The corpus analysed in this study is composed of all texts published between 02.05.1998 and 01.03.2013 in the 'Documents' section of the official website of the Polish Episcopal Conference (www.episkopat.pl). These documents were collected by means of Teleport Pro ver. 1.64, which downloaded all subpages with the address starting from www.episkopat.pl/dokumenty/. I then manually extracted the texts of individual documents from these downloaded documents. They were also manually cleared of their HTML codes and converted into .txt format and UTF-8 encoding files. This resulted in a corpus of 241 thousand words made up of 259 documents. Finally, the corpus was lemmatised by the use of PSI-Toolkit tools (Graliński et al. 2013) resulting in a corpus of 13,000 unique words.

Analysis

The analysis was conducted in the following steps (described in detail below):

1. Identification of collocation for the term *life* (Polish: *życie*).
2. Analysis of semantic preference for the term *life*.
3. Analysis of concordances in a selected group of collocations:
 - a. Classification of concordance into one of two domains: religious or secular.
 - b. Classification of concordance due to communication activity: criticising, instructing, or describing.
 - c. Analysis of quantitative relations between domains and communication activities.
 - d. Qualitative analysis of concordance for selected types of communication activities.

In the first stage, collocations for the term *life* were identified. Here, collocation is understood as "more frequent than random co-occurrence of two words within a pre-defined range" (Gabrielatos & Baker 2008). Discourse analysts assume unconscious interference of diverse meanings related to the cumulative effect of previous contacts with a given word or a collocation (Gabrielatos & Baker 2008) and therefore use collocation analysis as a starting point for further, more in-depth analyses of corpus data (cf. e.g. Freake et al. 2010, Forchtner & Kølvråa 2012). This choice was dictated by the richness of the material studied (1176 occurrences of the term *life*), which required analysis at a more general level, allowing me to see general patterns, which led to more nuanced analyses. Collocations were identified using the AntConc program and MI statistics (Anthony 2014). The list of collocations was generated within the window of three words to the right and left of the term *life*. Statistical relevance was assessed with the t-test ($\alpha < 0.005$) and five as a minimum number of co-occurrences.

After determining the list of collocations, I carried out an analysis of semantic preference, i.e. the tendency of a specific lexical unit to frequently co-occur with a series of units belonging to one semantic field (Salama 2011). Following this, I reconstructed thematic groups and ascribed individual collocations to them. I aimed to identify groups with an average level of generality so that they could preserve the specificity of the individual collocates while avoiding large fragmentation. The classification into thematic

groups was based on the collocates themselves, and only in cases of doubt did I refer to text usage. Function words were excluded from the analysis of semantic preference. After classifying the collocates into individual semantic groups, I carried out a quantitative analysis of interrelations within the groups, as well as between them.

The next stage was focused on the analysis of concordances for collocates related to secular life. This choice was dictated by the tension concerning the involvement of the Catholic Church in secular life in Poland. I expected that an in-depth analysis of the concordances of this particular group would allow me to reconstruct the position assumed by the Catholic Church regarding the lives of Poles. The first stage of the analysis was the classification of concordances into one of the two domains: secular or religious. Singling out such domains was also due to the tension between the high level of Poles' religiousness described above and their lack of acceptance of the Church's interference in secular life. When classifying concordances, I decided that only concordances of a clear religious nature should be included in the religious domain. In the second stage, I divided the same concordances according to the type of communication activity. I distinguished three types of such activity: Criticising, instructing, and describing. In this case, too, the distinction of such domains was dictated by the tension which was clearly expressed in the opinions of Poles: from frequent religious practices and acceptance of the presence of the Church in public space to aversion to opinions expressed by the Church on non-religious topics such as social life or sexual life. When categorising specific concordances, I employed linguistic markers to identify criticism and instruction. These included:

- Criticism: references to deficiency or excess (e.g. *lack of, too often*), expressions related to conveying fear (e.g. *our concern is*), and the use of negative adjectives (e.g. *unfriendly, unfavourable*).
- Instruction: use of imperatives, modal verbs (e.g. *must, may*), and verbs indicating the necessity of action (e.g. *need, expect, ought*).

I first sought criticism then instructing, and in the case of their absence, I considered a given example a description. Next, I analysed the quantitative relationships between domains and communication activities. At the final stage, the examples in which criticism or instructions were expressed were subjected to a further detailed analysis leading to the identification of the addressee of the criticism/instructing and their subject.

Results

Semantic preference

The term *life* in the examined corpus collocates with 246 words, 139 reaching the statistical significance of less than 0.005. After excluding function words (such as *and, in, to*) I retrieved a list of 73 collocates, which in total co-occurred 1588 times with the term *life*. These collocates were further analysed for semantic preference (Stubbs 2005). On this basis, I identified seven main semantic groups:

1. religion (*consecrated, eternal, society, priestly*),
2. secular life (*daily, matrimonial, personal, public*),
3. quality (*style, meaning, field, testimony*),
4. action (*save, introduce, defence, sacrifice*);
5. values (*dignity, value, truth, love*),
6. stage (*conception, death, day*),
7. subject (*human* (adj), *person, human* (n)).

All the examined collocations referred to the human being, which indicates a discursive construction of life as something exclusively concerning people. This is also confirmed by the collocates in the *subject* category. Life is also constructed as divided into stages, can be the subject of various activities from defence to sacrifice, and is also subject to evaluation in terms of its quality and with regard to certain values.

The quantitative distribution of the term *life* with collocates from each category is presented in Figure 1:

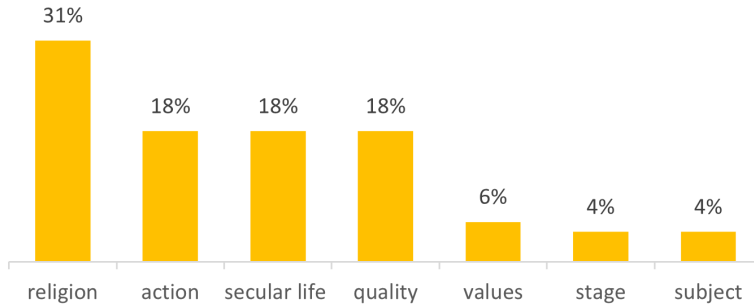


Figure 1: Semantic preference of term *life*

Slightly less than 1/3 of the examined cases refer to life in a religious context. This may point to the domination of the topic characteristic of the examined discourse, but it may also indicate that life is reduced to its religious character. A more comprehensive picture is provided here by dividing collocates from this category into two dimensions: institutional with examples such as *consecrated, association, priestly, institute, Church*, and spiritual (e.g. *eternal, vocation, holiness, spiritual, God, divine, faith*). The quantitative distribution of the collocates of term *life* in these dimensions is presented in Figure 2.

Collocates from the first category can be treated as indicators of the subject-specific to the discourse under investigation, while those from the second category can be seen as shifting focus to the religious dimension of life. The relatively equal distribution between both these dimensions does not permit to point to the domination of any of these dimensions. It is, however, worth noticing that in this discourse database, one in six occurrences of the term *life* is related to the institutional Church.

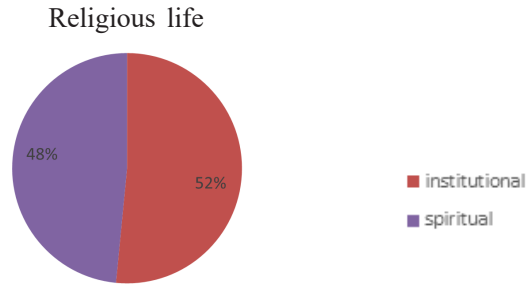


Figure 2: Distribution of the collocates of word life in institutional and spiritual dimensions

Another group is formed by collocates concerning secular life. This group includes both collocates referring to life in a very general way, such as *everyday* or *personal*, as well as those concerning family life (*family*, *marriage*) and those indicating interest in social life (*economic*, *political*, *public*). Their quantitative distribution is shown in Figure 3.

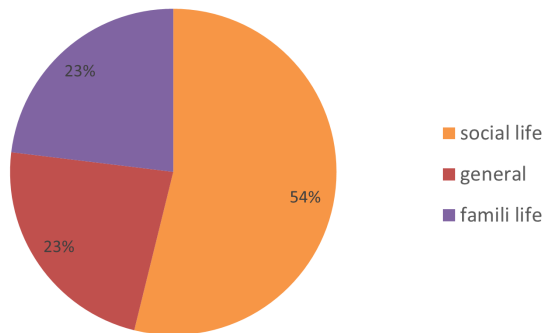


Figure 3: Distribution of collocates concerning secular life

It is worth noting that in more than half of the cases, the focus is on social or political life. This is particularly interesting given the previously discussed negative perception of the Church's involvement in the public sphere of Poles' lives. The analysis of the collocates alone, however, still has not allowed me to decide unambiguously whether it is rather explaining social life from a religious perspective or a direct involvement in this life and attempts to influence it. A clearer picture emerges from the concordance analysis for all the occurrences of term *life* with secular collocates.

In the discourse under study, secular life is mentioned both in its religious and non-religious context. In the first case, there are primarily indications of how the faithful should behave in public life e.g. *Let us be his witnesses at home, but also in public life. The world has the right to see Jesus' followers, who have met Him personally and live with Him every day in great intimacy*³. The emphasis is placed on bearing testimony to

³ Due to linguistic differences, some translated examples may not include the word *life*. For the sake of clarity in the English translation, I prioritized fluency over strict word-for-word accuracy

one's faith and acting as a witness to it, which shifts the focus from the private to the public sphere.

It is striking that it is the latter, non-religious group that prevails in the official statements of the Polish Episcopate. The exact quantitative distribution of concordances is shown in Figure 4.

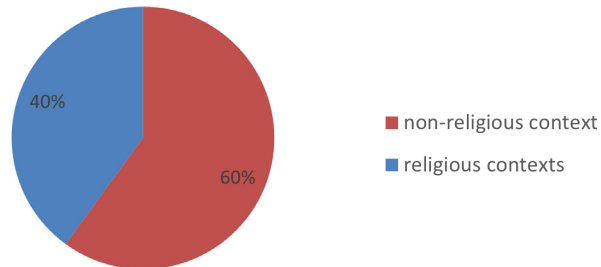


Figure 4: Distribution of contexts for secular life

In the attempts to answer the question how the Catholic Church positions itself in relation to the life of Poles, the way in which it talks about secular life is of vital importance. The passages quoted above suggest that not only does the Church describe or explain social life, but also criticises it or gives instructions concerning it. This assumption is confirmed by quantitative data (Figure 5).

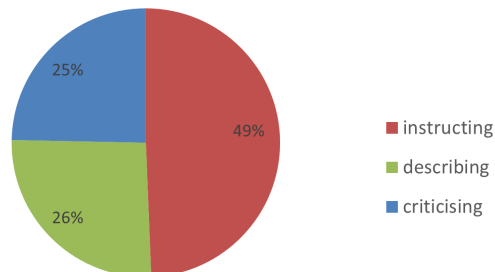


Figure 5: Distribution of communication activity

Nearly half of the statements analysed are various forms of instructions, ranging from strong imperatives (1st or 2nd person plural, e.g., *Be witnesses of Love in social life!*) to more subtle advice (e.g., *It is worth considering what areas of our personal lives we can bring more order and clarity into*). Most of these instructions neither specify who is giving them nor identify the intended audience, thereby conveying a sense of universality (e.g., *There needs to be a deep understanding of the principle of Christian obedience throughout our social life*). Therefore, in statements about secular life, the attempts to influence the shape of that life definitely prevail (75 per cent). Only every fourth statement is of a descriptive nature (e.g. *in this way, the leaven of God's grace enters the great bygone cultural, economic, and political life in the world (..)*).

In the light of this prevalence of instructing and criticising statements, the question emerges: who is the subject of this criticism, who is the intended recipient of the instruc-

tions, and what exactly is the focus or object of both the criticism and the directives. Among the addressees of the criticism, I have distinguished six groups:

1. Politicians: *We therefore share the concern about the quality and style of political life in our country.*
2. Society at large: *We see many worrying manifestations of social life around us: egoism, greed, and rapacity.*
3. We: *In our professional and personal lives, we have too often behaved in such a way and made decisions as if we doubted that love should be the most important motive for our actions.*
4. Unspecified subject (unknown *they*): *We see a clear campaign, a whole strategy for eliminating God from the lives of nations, societies, and people's consciences.*
5. Social phenomena such as secularisation and alleged aggression against the family: *Undoubtedly, a huge challenge for religious people is the galloping secularisation processes, which attempt to reduce people solely to the material level and to relegate religion to the margins of social life or to confine it entirely to the private sphere.*
6. Others, such as families, young people, secularised people, you: *Our families are experiencing confusion and doubt about the fundamental meaning of marriage and family life.*

The quantitative distribution for the individual addressees of the criticism is shown in Figure 6.

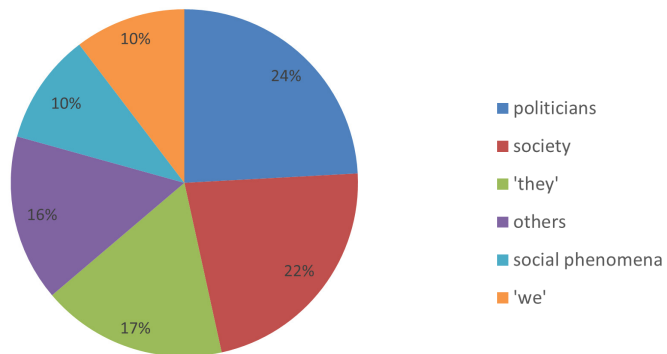


Figure 6: Distribution of criticism of different addressees

Every fourth criticism (14 out of 58) is directed at politicians. It concerns only the secular dimension of life, and it appears in statements with collocations classified as belonging to social life (the vast majority) and family life. The subjects of criticism are not directly related to the Church. Let us take the example of political culture (e.g. *using the structures of public life, and especially the institutions of the state for individual or group benefits, is a denial of properly understood politics*) or the social situation in Poland (e.g. *Given these painful phenomena in our social life, the question arises: are we helpless against evil?*). However, there is also criticism concerning the attitude of politicians towards the Church (e.g. *it is not uncommon for us to encounter manifestations of hostility towards Christ, His Gospel, and the Cross, as well as attempts to exclude the*

Church from public life). Thus, in the discourse under study, there is both the prospect of defending one's interests or position and of caring for the common good.

The next most frequent group (13 out of 58) comprises critical statements, which do not directly identify the addressee of the criticism, even though the criticism always concerns phenomena that feature a doer. In the following case, the criticism is more directly related to the religious sphere because it concerns the removal of religion from public life (e.g. *When anyone tries to remove Christ from public life and wants to build a Europe without Christ, it has to be said with truth and for the sake of Europe that it would be building on sand*). Without a clear indication of those responsible, the violation of "the right to life" is also criticised (e.g. *Bishops sympathise with communities, including the media, which consistently defend the inviolable right to life, even at the price of unjust accusations and sentences*).

As shown in Figure 6, every tenth critical statement is self-critical (6 out of 58). However, this is never a criticism of the representatives of the Church itself. The *we*-subject of these statements is always inclusive and concerns both speakers and listeners. This criticism appears in statements with collocates from the social field as well as those of a general nature. It concerns certain lifestyles (e.g. *The difficulties of everyday life meant that, although we were constantly experiencing many graces, our prayers were more often pleading than thankful*) as well as our attitude towards the family (e.g. *In social, economic, and cultural life, we allowed the family and its rights to be ignored*). Thus, here as well, what is being criticised is not directly related to religious practices or attitudes towards the Church pointing again to the discursive involvement of the Church in social life in Poland.

The target groups of the Church's instructions are not very different from the groups which are criticised:

1. We: *let us be His witnesses at home, but also in public life.*
2. Politicians: *We are concerned that those responsible for shaping our social and political life are guided by concern for the common good (...).*
3. The family: *Above all, it encourages us to see the presence of God in the everyday life of the family (...).*
4. Other groups such as members of church movements, employers, and representatives of certain professional groups such as teachers.
5. Not specified (...) *faith should have consequences for society in the wider sense.*

There is, however, a clear difference in the quantitative distribution of the instructions (Figure 7).

Slightly more than a third of the instructions are formulated in the first-person plural (*we*). As in the case of criticism, it is an inclusive *we*, concerning both speakers and listeners (in this case, however, there are two exceptions⁴).

Among the actions that are the subject of self-instructions, many are directly linked to religion. These include following Christ (e.g. *we are called to obey His calls and to follow Him in our personal and social lives*), witnessing to the faith with life (e.g. *we*

⁴ (1) *they are waiting for the sacraments of which we are the ministers*, (2) *They await the testimony of our personal life, our faith.*

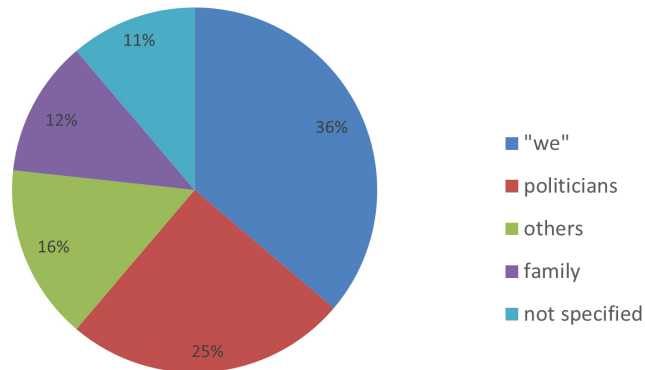


Figure 7: Distribution of instructions for different addressees

are called to be witness to the Gospel of salvation in our daily lives), with particular emphasis on witnessing in the public sphere (e.g. *Let us be His witnesses at home, but also in public life*). There are, however, also matters that are not directly related to the religious sphere, namely:

- the protection of “the unborn life” (*On the threshold of the 21st century we face common tasks: protecting life, marriage, and family*),
- specific actions related to the family (*This creates an opportunity for us to reflect on topics that are important for every Christian family, and also because of the nature of family life, important for every family*),
- attitudes in conformity with specific values (*An important task today is to develop the imagination of mercy, which allows us to see new opportunities for the realization of grace around us*).

Politicians are the second most frequent group of instruction addressees. Every fourth instruction appearing in the studied material addresses them. These instructions take only two forms:

- imposing standards (e.g. *The government should strengthen the position of families, and improve the level of health care for women and girls*),
- indicating expectations (e.g. *however, we expect people and institutions responsible for the shape of political, social, and economic life to take effective action*).

It is worth noticing that in both cases these are indirect forms of instructions. The thematic scope of these instructions is also different. While self-instructions were largely linked to religious life, instructions addressed to politicians have no link to religion. They relate to three main thematic areas: the defending of “the conceived life” (e.g. *an important task is to take action to promote the right to life of all conceived children, as well as effective family policies*), ensuring an appropriate standard of living for the citizens (e.g. *we expect people and institutions responsible for the shape of political, social and economic life to take effective action so that Poles can find decent conditions for work and life above all in their homeland*), as well as to acting by a specific catalogue of principles (not necessarily of religious nature) (e.g. *according to bishops, all aims of social and political life must be achieved using always morally good means*).

Every tenth instruction touched upon the family. These instructions adopt forms similar to self-instructions, such as suggestion⁵, imperative⁶ and indicating the norms explicitly⁷ and implicitly⁸. Thematically, however, issues related to religious life prevail here, such as the performance of certain religious practices (e.g. *Celebrating Sunday in the family may give rise to specific attitudes in the family's daily life*) or adopting a certain attitude towards God (e.g. *Above all, it encourages us to notice the presence of God in the everyday life of the family*). The only subject not related to religious life was participation in social life (*let us ask the question: how does every family participate in creating bonds of social life?*). Additionally, no guidance regarding family relationships⁹ or the ways in which members should treat one another was observed.

Discussion

In my research, I sought to investigate the position that the Catholic Church in Poland assumes with regard to the religious life of Poles, their private life, as well as social and political life. Based on the results presented above, three positions can be indicated:

1. a somewhat involved observer of the religious life of Poles
2. a religious guide in private life
3. an authority deeply engaged in social and political life.

The initial mode of self-positioning by the Catholic Church becomes apparent upon a preliminary analysis of collocational patterns: one in every six collocations has a religious character and refers to spirituality, which in the official discourse of a religious organisation can be considered relatively low. The Church's positioning of a somehow involved observer was also visible in the analysis of concordances concerning secular life: less than half of them relate to the religious dimension of this life. Only slightly more than a third of the instructions refer to the community of believers (the collective we). In this case, too, the emphasis is often placed on bearing witness to one's religiousness in the public sphere. In addition, only one in ten of the criticisms examined concerns members of the Church (the collective we). This criticism also does not directly concern religious practices or spirituality.

In relation to the private life of Poles, the Church takes the position of a guide in the religious dimension of this life. The instructions addressed to the family are mostly related to widely understood religious practices. Also, the focus of statements concerning everyday life is on the religious life. The fact that all statements about private life are instructions underlines the taking of the role of a guide.

⁵ E.g. *Above all, he encourages the recognition of the presence of God in the everyday life of the family.*

⁶ E.g. *We appeal to parents: be present in the life of children and young people.*

⁷ E.g. *The vocation to be wife and husband, mother and father sets absolute limits to all professional and social involvement.*

⁸ E.g. *The right form of celebrating can save and restore full dignity to family life.*

⁹ With one exception for the relationship between parents and children: *we appeal to parents to be present in the lives of children and young people.*

The last position taken by the Church starts to be apparent at the level of the analysis of collocations: every fifth collocate concerns secular life, and half of the collocates related to secular life concern social and political life. This trend is also confirmed by the results of concordance analysis: 60 per cent of all statements with collocates classified as social are related to the secular dimension of life. Thus, when the Church's discourse tackles social life, these statements relate to its secular dimension and are devoid of references to religion or spirituality. The interest in political life, on the other hand, is indicated by the fact that one in four of the instructions analysed and one in four of the critical statements address politicians. Given the religious nature of the texts examined, which include pastoral letters read at mass instead of homilies, such a share of social issues and those not directly related to religion or spirituality seems significant. The fact that almost half of the statements produced about it are instructions and a quarter are criticism is proof of the Church positioning itself as an authority in this domain. Thus, the vast majority (74 per cent) of statements concerning social life are made from the standpoint of a superior, a position of a subject that has the right to instruct, criticise, and impose norms. This position can also be dubbed, as Graff (2010) puts it, a manager of the values.

Each of the above-mentioned tendencies is reflected in the views of Poles, as well as their attitudes towards religion and the Church. Low interest in the spiritual life and religious dimension of secular life is visible at a similar level of interest in these aspects of religion among Poles. Most Poles have a secular approach to religious holidays and rituals and do not understand their symbolism and meaning. This applies, for example, to a completely secular way of celebrating the sacrament of marriage, a lack of understanding of the symbolism of Easter celebrations, or a lack of understanding of the meaning of Confirmation rites declared by the confirmed themselves (Baniak 2007). The low level of interest in religiousness is also evident in the relatively low acceptance of Catholic dogmas; for example, as many as 14 per cent of Catholics do not believe in the dogma of eternal damnation (Zaręba 2010), and nearly half of Poles declare that they are believers, but in their way (Boguszewski 2009). The absence of religion in the secular life of Poles is manifested, for example, by a fairly widespread acceptance of practices rejected by the Church, such as the use of contraceptives (68 per cent consider it acceptable or conditionally acceptable), premarital sex (71 per cent), permanent living with an unmarried partner (55 per cent) (Zaręba 2010) or same-sex partnership (42 per cent) (Scovil 2021). In addition, when faced with moral dilemmas, Poles prefer to be guided by their conscience rather than by the Church's guidelines (Zaręba 2010), especially in the case of married and sexual life. The prevailing opinion is that the latter sphere in particular should depend solely on the spouses themselves (Baniak 2007). Summarising his research, Zaręba (2010) highlights the tendency for references to God in everyday matters to diminish, which can be interpreted as a direct reflection of the disinterest in the spiritual and religious dimensions of secular life, as evidenced in the discourse analysed.

Poles accept the Church's position as a guide to the religious dimension of private life. This is evidenced primarily by the high rates of religious practices described above. What is more, more than 50 per cent of Poles perceive Mass as the fulfilment of their

duty to the Church (Zareba 2010), which suggests that the Church is perceived as an institution to which the faithful are obliged to do something and which has the strength to impose this obligation. A similar way of seeing the Church and its authority is visible in the statements of parents of children who are about to have their Confirmation. They regard this sacrament as ‘yet another rite to be fulfilled if “such” is the Church’s wish.’ (Baniak 2007).

Poles’ attitude to the Church’s focus on social and political life is ambivalent. On the one hand, the acceptance of the presence of the Church in the public sphere is widespread and constant: more than three-quarters of Poles accept the participation of Church representatives in state ceremonies (81 per cent), the consecration of public places, and buildings (78 per cent), the appearance of priests in public television (74 per cent) or the religious nature of the military oath (83 per cent) (Grabowska 2015). Public life is therefore considered to be a sphere to which the Church has access, while this presence outrages only a small proportion of the population (about ten per cent). Therefore, at this level, the Church’s discourse remains consistent with the expectations and views of Poles. The perception of the Church’s influence on political life described above also remains consistent with this trend (66 per cent of Poles see the Church’s involvement in politics (Adamczuk 2001)). However, despite the discursive focus on this aspect of secular life, there is a lack of consent among Poles for the Church to interfere in political life: let us recall the data already quoted above more than half of Poles are outraged by Church representatives commenting the laws passed by the Sejm, 84 per cent do not accept that priests should tell their faithful how to vote in elections (Grabowska 2022b), and 37 per cent perceive engaging in politics as a problem faced by the Catholic Church in Poland (Głowacki 2019). Thus, while the focus on social life is not questioned and is accepted, the focus on political life is a tendency that arouses quite widespread opposition among Poles.

Conclusion

However, some reservations must be made about these results. First, the evaluation of semantic prosody was based only on collocates, without analysing the context in which they occurred. In some cases, therefore, this may have led to a different classification from the one that would have been made after having studied that context. Nevertheless, I believe that these are individual cases that do not have a significant impact on the overall picture resulting from this analysis. Secondly, in a concordance analysis, I have focused solely on the collocates categorized as concerning secular life at the expense of examining statements about life in religious or value contexts. I assume that the tension outlined in the first part concerning the functioning of the Catholic Church in Poland primarily concerns its presence in social or public life, i.e. the area of secular life. Therefore, the analysis of this very area of discourse about life allows for the most adequate reconstruction of the position that the Catholic Church in Poland takes.

These findings demonstrate how the Catholic Church in Poland constructs and sustains its authority through its discursive practices. They also reveal that the positioning of the

Church in life in Poland aligns with the social situation and is against the will of the majority of Poles. However, recent years have brought some signs of change in this social situation. The large-scale protest against harsh anti-abortion law (November 2020) had strong anti-church and anticlerical dimensions. The number of men entering the priesthood is crumbling: from 725 starting their education in seminaries in 2015 (Katolicka Agencja Informacyjna 2022) to 338 in 2022 (Katolicka Agencja Informacyjna 2022). Also, the percentage of students attending school-thought religion declined from 93 percent in 2010 and 70 in 2018 to only 54 in 2021 (Grabowska 2022a). There is also a significant drop in the number of people seeing religiousness as an important value to be taught by the parents: from 29% in 2009 to 16% in 2022 (Bożewicz 2022). Therefore, the above-identified discourses may be used to question and challenge this unwanted positioning of the Catholic Church, thereby supporting social change.

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On the prospects of a logical-semantic approach to creating a code for artificial thinking

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Abstract: This article substantiates the practical possibility of modeling the information component of thinking using modern computer technologies, providing programmers with a code diagram of general artificial thinking for familiarization. The rationale for the approach is based on the ideas of the theory of knowledge, philosophy and methodology of language. Attention is paid to the discussion of some provisions of the criticism of artificial systems of thought.

Keywords: artificial thinking, logical-semantic approach, information modeling, philosophy of language, data processing, reality visualization, cognitive linguistics, generative linguistics, linguistic competence, informational modeling

In this article, we will attempt to discuss the prerequisites for possible explanations of artificial thinking mechanism from the standpoint of its connection with language and reality, in order to determine the logical-semantic approach to describing the architecture of the information model of thinking, justified by the modern level of linguo-philosophical knowledge.

These explanations and descriptions require some generalization of well-known linguo-philosophical paradigms and are aimed at the practical implementation of the proposed architecture in a real software product, and at a subsequent verification of its functionality.

We saw the task of linguistic knowledge in the era of the information revolution to provide programmers developing strong artificial intelligence technologies with the tools of linguistic philosophy. The solution to this problem is to substantiate the logical-semantic approach to the representation of the artificial thinking code diagram, the construction of which follows from the main well-known areas of linguistic theory and linguistic philo-

sophy, and to propose a namespace for variables, functions and modules that determine the content of the code both from theoretical positions and from positions of practical coding.

However, first, it is necessary to explain the basis of our approach to creating a model of artificial thinking, since there is a reasonable criticism of the possibility of the appearance of a thinking computer by linguists and philosophers we respect.

The sharpest and most just argument in this criticism is the description of the “Chinese Room” by J. Searle (1993: 3-66). From this follows the conclusion that it is impossible to get an idea of reality only by processing the data of the sign system. And indeed it is. However, we must remember that the year of the first publication of the “Chinese Room” is 1980, and the speed of data processing at that time did not allow digital imaging to be included in the fast processing process. Now, more than 40 years later, the speed of data processing allows processing the simultaneously presented sign of the language and the data of the surrounding visual world, which, in our opinion, is a key requirement for reflecting discourse. Visualization and/or replacing/supplementing it with the data of the surrounding reality solves the main task, which is predetermined by the theme of the “Chinese Room” – to connect the processing of the data of the sign and his designate. It is the process of generating the unity of the sign and his designat, which solves the problem of the “Chinese room”, and, then, by this article we intend to initiate the usage of the information component of this unity in artificial thinking. Let us recall, in this regard, the key conclusions of Saussure’s semiotics (1933: 55-197): language can be represented as a system of relational dependencies, and language is a system of conventional signs. The data processing of the sign system in the “Chinese Room”, Searle spoke about, raises the problem of determining only relational dependencies and does not touch upon the issue of conventionality, since the conventional nature of the sign of a language has as its subject the unity of the signifier and the signified, while the relational nature of language has only a sign system as its subject.

Linking the processing of language and the visual part of reality into a single whole by means of simultaneously processed speech and visual signal, however, we immediately face the following justified criticism of any attempts to obtain artificial intelligence. These are the factor of “transcendence”, in terms of Kant (1964: 585-695), and the factor of participation of “non-objectifying”, in terms of Husserl (Prechtel 1999: 23-29), not substantiated by the reality of mental acts in human thinking, those are the subject of constant linguists disputes about the object of linguistic knowledge, rooted the unknowable part of brain activity. Brain processes are not directly observable, so there is no point in guessing about what is, in principle, inaccessible - this is the main thesis of antimentalist-minded descriptivists. Bloomfield believed that “the descriptive order of grammatical features is generated by the method of describing linguistic forms” (Bloomfield 1933: 213). To interpret the external behavior of an individual in terms of brain/psychic entities is to fall into a logically vicious circle: to explain the visible through an unknown cause. Authoritative representatives of analytic philosophy echo this argument: We “should never be concerned with reducing the one to the other, nor explaining the one in terms of the other. Philosophy is indeed purely descriptive” (Wittgenstein 1964: 18).

However, the mentalists were not powerless in solving this problem. It is known that the relatively recent cognitive trend in linguistics raised questions about what are the

general integral foundations of the processes of cognition and what manifestations of the unknowable part of thinking can be studied. Methods for detecting such grounds and fixing such manifestations are information-theoretic modeling. Moreover, the leading methodology of the cognitive sciences is the informational approach, which considers reality from the point of view of the information processes that take place in it, and “a person is understood as a thinking system in the world of information” (Baksanskii 2005: 82-83). Generative linguistics, which is a special object of our attention when constructing a code of artificial thinking, is also in dire need of mental reality, since it relies on the category of competence, in which mental states perform a causal or generative function in relation to observed communicative processes, and events, which include mental constructs can function as links in a causal chain. One of the leading theorists of rationalism, J. Katz, explains the essence of causal mentalism, emphasizing that “if the logical consequences of the model are consistent with the observed behavior of the system and would not do this without the hypothesis put forward, then the scientist has the right to say that the hypothesis explains the behavior of the system in terms of the observed, but a causally effective component” (Katz 1965: 128). The linguist builds a theory on the basis of a hypothetical conclusion about the characteristics of the mechanism underlying communication. Believing that the observed events of linguistic communication are a consequence of this mechanism, he proposes a theory about the structure of this mechanism and a causal chain connecting it with observed events to explain how these internal causes give rise to linguistic communication as their effect. The ability to model the informational part of thinking with modern computer tools brings to the fore not only information-theoretical modeling, which currently has a central place in the methodology of cognitive linguistics, but also practical information modeling, which expands the paradigm of cognitive knowledge: we get a methodological basis for explaining subjectively-oriented (anthropological factor) of ordinary cognition through agent-oriented (computer factor) cognition, implemented in a specific algorithmic code.

So, we are not going to model consciousness in order to create a mechanism of artificial thinking: its processes are not known. We are going to model thinking, and do it from the perspective of the information component of thinking. We must make several important explanations in this regard.

The first explanation is about the linguistic reflection of the non-objectifying component of human thinking by the code of artificial thinking. This component is assessments, desires, emotions, that is, intentional non-objectifying acts manifested in the signs of the language. At the same time, desires, emotions, assessments, as a meaningful result of these acts, are represented by a significant part of the human lexicon, that is, they are designated as any real object is designated, and their designation has the same conventional nature, any language sign has. A single apparatus of artificial thinking should not be endowed with complete information of human sensory perception or a mechanism of empathy. Not all of us are astronauts, but all of us, from a certain age, can use the word “weightlessness”, operating with it with the proper level of relevance. The same can be said about the word “drugs” and many other words. Obviously, in the minds of not all people, the complete conceptual composition of the language is represented using sensory data at a non-objectifying level. But, however, all the richness of the native language

is available to the thinking of the native speaker of this language. How exactly does this happen? We conclude that it is possible for artificial thinking to objectify, for example, the concept of “pain” with discursive data of the corresponding behavior of its main user, as we do when linking the concept of “weightlessness” and the broadcast from the orbital station that we once saw.

The second explanation is about the role of the material basis for the production of the thought process. In our project, we proceed from the conclusions of the relativistic direction of linguistics and semiotics about the nature of the sign, the signified and their unity. The key role in the functioning of a linguistic sign is played not by its material basis, but by its distinctive meaning, manifested in its relationship with another sign and signified meaning. Illustrating the irrelevance of substance for the functioning of language as a structure, Saussure says that the replacement of wooden pieces by ivory pieces (substantial qualities) in chess is indifferent to the system. But, if you increase or decrease the number of figures (relational qualities), then this “will deeply affect the ‘grammar’ of the game”. (Saussure 1933: 45).

The following explanation concerns the “question of truth”, in terms of Tarski (1972: 136-145), the solution of which is important when operating with a conventionally justified sign of the language in order to implement the very mechanism of mental reaction to the current reality. “Existent substance and nomination”, in the terms of Arutyunova (1976: 205-283), generated on the concrete-referential basis of the visual series, manifest “apodictic evidence” in terms of Husserl (Prechtel 1999: 37-40) of existence as an independent value/significance, in turn generate relation to the truth of subsequent processes of predication and identification. Both of the last mentioned processes are included in the function of generating data of a universal, and then an abstract reference, which is not directly related to the current composition of the incoming data. The concrete-referential basis of the processes of predication and identification in the discourse of visual content lays the foundation for the truth of thinking in general, which includes abstract concepts – ideas, that are not directly correlated with the surrounding visual reality. Thinking in general, in the context of the informational approach, can be understood as augmented reality, where the concrete-referential content of predicative constructions tied to apodictic evidence is filled with universal and abstract concepts used by thinking. The discourse itself at a certain stage in the development of thinking appears as an augmented reality in which the plan of content does not coincide with the plan of expression. However, this does not destroy the doxal nature of thinking, which permanently evaluates reality from the standpoint of truth.

The creation of a descriptive and explanatory basis for the general architecture of artificial thinking is aimed at revealing the content of the meaning formation process, what Chomsky (1968: 5) explains as “innate knowledge” in his theory of competence. We believe that the content of the process of meaning formation is represented by the predicative-discursive structure of data segmentation. For all data coming from the visual and speech stream, the code finds a place in the predicative part (Fig. 1), and in the discursive part of the structure (Fig. 2). This is the top level of data processing. It is preceded by the segmentation of visual stream data in the “Representamen” structure component in the phenomenological sense of Peirce (1953: 212), as that “information

about the essence that the phenomenon carries in itself” and speech stream data in the “Glossema” structure component in terms of Hjelmslev (1960: 66-337), as “the shortest unit of linguistic meaning” (Fig. 3). The work of these structures is ensured by the basic principle of the code functioning: the principle of cyclical movement of information. The principle of cyclic movement provides a constant flow of interpretive knowledge into the interpreted and vice versa. At the stage of movement from the visual-speech flow to the predicative-discursive structure, the knowledge previously accumulated in the areas of “Representamen” and “Glossems” is interpretive, and the new information at the stage of its segmentation in the current predicative-discursive data structure is interpretable knowledge. The signal of relevant segmentation of data in this structure is the discovery of the previously known environment of these data in the paradigmatic hierarchy of reality, built on the theory of “hard designators” Kripke (1986: 194-242) and in syntagmatic sequences. Otherwise, the code is forced to form a new knowledge paradigm, in which the new information will be relevant and will receive a new truth evaluation matrix. After the relevance has been verified, the new information has fulfilled its role as a signified (interpreted knowledge) and is ready for the role of a signifier (interpretive knowledge) before a new cycle. Thus, the generative essence of language competence described by Chomsky is implemented in the code.

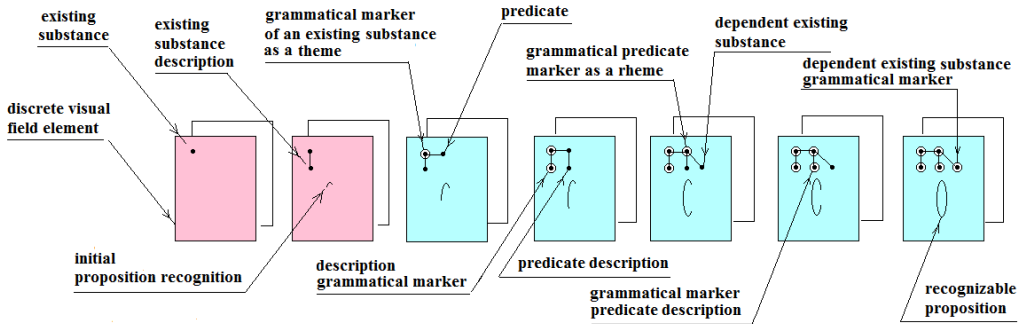
In order to implement the proposed model, it is necessary to further develop specific technological operations. Thus, an essential technological aspect of cyclic information processing that requires further development is the description of the data that form the beginning of the cycle and the level of transformation of this data at the end of each cycle. For practical implementation in the code of the matrix of the truth, it is also necessary to further study the issue of the information technical division principles in accordance with the specified markers of doxality “fantasy (absence of doxality)–denial–doubt–assumption–belief–conviction–truth”. If the first and last elements of the given scale can rely on a strict algorithmic procedure for the correspondence of the assessed information to the data that have received the status of interpretive, then the technological basis for determining the correspondence of the assessed information to the intermediate markers requires additional development.

The code diagram shows the process of initiating linguistic communication. Based on the current discourse, the code forms the target discourse, mobilizing, on the one hand, the data of the possible continuation of the current discourse with the data of discursive sequences and the paradigmatic hierarchy of the truth picture of the world, and, on the other hand, the data of discursive sequences of the modal-evaluative content of the main user and the paradigmatic hierarchy of his priorities. The transition formed by the memory data in the form of a discursive sequence from the current discourse to the target one forms the basis of the signified in the mental reaction. The current situation is only a new way of ordering the old, already existing material. This amazing thesis was once expressed by Marcel Proust, who said that when, for example, one reads his book, then “with the help of his book one reads oneself” (Proust 1927: 201).

The code diagram of artificial thinking, giving an answer to the question of how exactly a thought arises and develops in discourse, defines the basis of a software product with its namespace, the terminological essence of which we strive to convey to coding programmers.

The predicative structure formation *

(synchronous view)**



* The complete predication structure model has additional components, but it is finite in its representation.

** The real representation of the structure of predication in the code is diachronic.

● The stage of existence relations and nomination relations in the pre-discursive process.

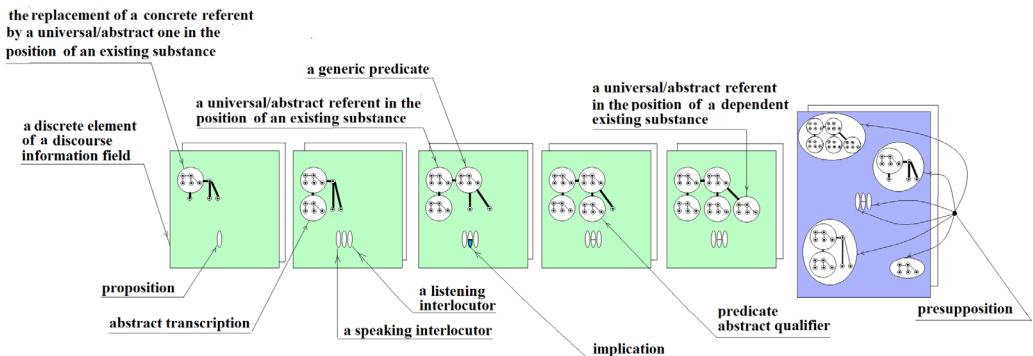
● The stage of predication and identification relations in visual discourse

The author intends to determine in subsequent works the relationship, functions and a detailed description of the diagram components, as well as its elements not mentioned in the article.

Figure 1. The predicative structure formation

Discourse formation process

(synchronous view)*



* The actual representation of discourse in code is diachronic.

● The process of an abstract discourse formation.

● Synchronic type of discourse with elements of concrete, universal and abstract reference.

In subsequent works, the author intends to determine the relationship, functions and a detailed description of the components of the diagram, as well as its elements not mentioned in the article.

Figure 2. Discourse formation process

At this stage, the proposed model is theoretical in nature. For its implementation, it is necessary to confirm it with experimental results and a prototype, which is being worked on.

Artificial thinking code diagram

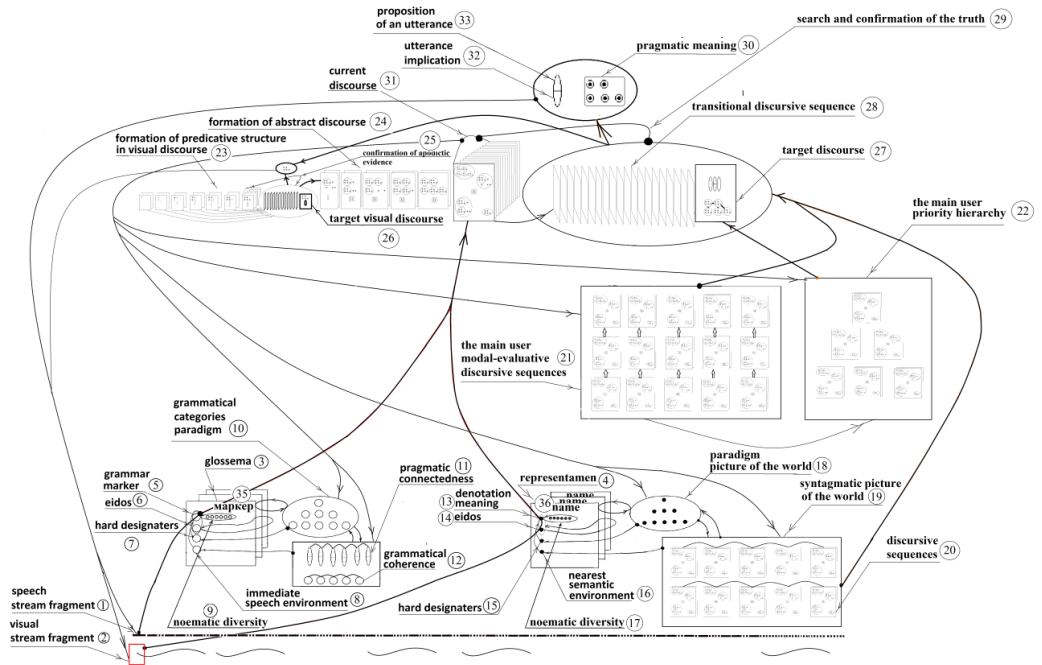


Figure 3. Artificial thinking code diagram

We believe that this diagram approximates our understanding of metalanguage, that is, that element of Kant’s “a priori”, Chomsky’s ideas about the “linguistic innateness” of a person, which allow people to acquire any language as the basis of empirical knowledge. Taking as a basis Saussure’s brilliant conclusion: “the whole linguistic mechanism revolves around identities and differences” (Saussure 1933: 109), we show how visually completely dissimilar things (visual data) acquire something in common, equivalent, which absolutely equalizes them, turns them into identity (certain component of predicative structures and discourse). In our view, this process realizes the emergence of linguistic value in the understanding of Saussure. The technology of building a presupposition of a holistic discourse is associated with the emergence of predicative structures, the components of which can themselves be expressed by predicative structures that do not have a formal visual connection with the current discourse, maintaining abstract concepts. We proceed from the fact that the holistic discourse of the ideal speaker/listener is abstract. The very formation of the presupposition of abstract discourse by predicative structures of visual

discourse, which previously realized the grammatical structure of the language, is based on the Sapir-Whorf hypothesis of recognizing the relationship between thinking and grammatical categories, on Whorf's statement that "the fundamental system of language (in other words, grammar) is not just a means of expression ideas, but a means of forming ideas" (Whorf 1956: 212-213), that is, a means of abstract thinking.

This article does not consider the ethical side of the model implementation. We consider the accumulation of data revealing the subtle psychological characteristics of each individual user to be a significant ethical problem associated with the creation of artificial thinking systems using the proposed model. Since it is in accordance with the identified aspects of the discursive behavior of an individual user that the proposed model can form the composition of interpretive data of the vocabulary of intentional content. Taking into account potential biases and social consequences of this factor requires separate coverage.

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Bartholomae's law revisited and remodelled

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Abstract: The present paper deals with Bartholomae's Law in Indo-Iranian languages. After a new examination of the data, it concludes that in the case of Bartholomae's Law, there is no assumed 'transfer of aspiration' or any other similar process but that the attested plosives are the result of a process of plosivization of the original Indo-Iranian voiced fricatives Δ ($<$ IE $*D^h$). Thus, the process described by Bartholomae is not an exception in developing of plosive clusters but a regular process affecting the original fricatives, plosives in the outcome clusters being of secondary origin.

Keywords: Bartholomae's Law, voiced aspirates, voiced spirants; Indo-European; Indo-Iranian

1. On Bartholomae's Law in general

Observing the development of the Indo-European clusters formed by two obstruents into Indo-Iranian,¹ we see that the typical assimilation process affecting these clusters is **regressive** in its orientation, the left² standing obstruent being assimilated both in voice and aspiration to the right standing obstruent. However, the clusters formed by the left IE voiced aspirate $*D^h$ and a voiceless plosive on the right are remarkable exceptions since they are subject to the assimilation process of a **progressive** orientation where the right unaspirated voiceless plosive becomes voiced in both Indo-Iranian branches and also aspirated in Indic, the process described by **Bartholomae's Law**.³ In Iranian, even the

¹ Though some authors consider the Law to be operating already in IE (cf. Kuryłowicz 1935: 50-51; Lubotsky 2018: 1879), we support the idea that the Law is exclusively Indo-Iranian (e.g., Szemerényi 1990: 107; Hoffmann & Forsmann 1996: 95-96). Noteworthy is that the possible validity of Bartholomae's Law for Germanic was examined in recent years, especially by Görtzen (1998: 444-448) and Hill (2003: 218-220).

² The terms *left* and *right* are here used purely conventionally to describe both an earlier (left) and later (right) pronounced element.

³ Named after Christian Bartholomae, who described the mechanism first (for details and history of the law, see below).

right sibilant become voiced as well (the question of original aspiration of both types of right obstruents in Common Indo-Iranian will be also discussed).

NB: For simplicity, we use the traditional IE triad $*T - *D - *D^h$ (used since Lehmann 1952) as purely algebraic symbols, without any attempt to attach any phonetic values to them, as we are willing to refuse to use any of many alternative models (‘glottalic’, ‘ejective’ etc.). What is remarkable both $*T$ and $*D$ behave in the examined clusters in the same way, with the same outcomes, unlike $*D^h$; hence, the unique symbol T/D will be used in formulae.

Our analysis will focus only on clusters formed by the right-standing $*t-$ and $*s/\š-$ ⁴ (‘Bartholomaeian clusters’) since these are generally the most common both in derivative and inflective morphs; the examples we will use are those of the verbal derivation and inflexion since securely attested and synchronically productive.

Analogical clusters formed by a right standing $*d^h-$, though not strictly Bartholomaeian,⁵ will be examined as well since they represent the functional background for the above-mentioned Bartholomaeian clusters; hence, the clusters we will examine are:

- i. formed by an IE left obstruent ($*T/D$,⁶ $*D^h$);
- ii. followed by a right obstruent: $*t-$, $*d^h-$, $*s/\š-$.

There are six possible combinations, including either Bartholomaeian or non-Bartholomaeian clusters: $*T/D + *t/d^h/s$ and $*D^h + *t/d^h/s$.

2. Bartholomae’s Law in Indo-Iranian

As we wrote above, Bartholomae’s law is well attested as a synchronic process in both Old Indic and Iranian (Avestan). However, the two branches differ in the number of clusters affected by the process and the outcomes.

NB: Old Persian does not have any attested ‘Bartholomaeian outcomes’, the cluster $*D^h t$ has only a non-Bartholomaeian regressive outcome TT (cf. OP ppp. *basta-* derived from the $\sqrt{\text{band-}}$ ‘bind’ cf. LIV² 75-76; Cheung 2007: 4-6; Brust 2018: 265; ppp. *gasta-* from $\sqrt{\text{gant-}}$ ‘stink’; cf. Cheung 2007: 103-104; Brust 2018: 177-178), the cluster $*D^h S$ has no known outcomes either Bartholomaeian or not. In Old Persian attested clusters $*T/Dd^h$ and $*D^h d^h$ are naturally not subject to Bartholomae’s Law, resulting from the (expected) regular regressive process (cf. OP adv. *azdā* if from $*\sqrt{\text{ad}^h-}$; cf. LIV² 222; Lipp 2009b: 87; Cheung 2007: 153; Brust 2018: 132-133).

The differences between the two branches are as follows:

⁴ Both sibilants are just positional (according to the *ruki-rule/Pedersen’s Law*) variants of a single sibilant.

⁵ Non-Bartholomaeian clusters with $*d^h-$ are subject to regressive assimilation but share outcomes with the Bartholomaeian $*t-$ clusters, as shown below.

⁶ OIA voiceless aspirates never enter the clusters in the left position, being always separated from the right obstruents by an inserted vowel (cf. Šefčík 2012).

In **Indic**, only clusters resulting from $*D^h t$ were affected (marked **bold**). The clusters $*D^h s$ have, unlike in Avestan, newly created regressive non-Bartholomaeian outcomes (marked *cursive*):⁷

Table 1

OIA	$*t-$	$*s-$	$*d^h-$
$-*T/D$	Tt	Ts	Dd ^h
$-*D^h$	Dd^h	<i>Ts</i>	Dd ^h

On the contrary, Bartholomae's Law affects two types of clusters (marked **bold**) in **Avestan**: $*D^h t$ and $*D^h s$ (see the table with the analogous non-Bartholomaeian clusters):⁸

Table 2

Av.	$t-$	$s-$	d^h-
$-*T/D$	Θt	(Θ)s	Dd
$-*D^h$	Δd	Δz	Dd

However, Avestan also exhibits a large number of analogous regressive outcomes besides the regular Bartholomaeian (Tt and Ts instead of Δd and Δz); parallelism, on the contrary, is entirely unknown in Indic, which always has only one type of output.⁹

Another essential difference between the two branches is the one affecting the location of the left plosive: in Iranian, the left peripheral (velar or labial) plosive is fricativized before $*t-$ but in Old Indic, the plosive is preserved. In Iranian, the left central (dental or originally palatovelar) plosive is sibilantized; in Old Indic, only palatovelars are realized as sibilants (as in other *satəm*-languages).

For the reconstructed Common Indo-Iranian state, we assume that:

- i. there was an original IE triad $*T, *D, *D^h$,¹⁰ attested still later as a triad in Indic and with its third member neutralized on D in Iranian; however, Bartholomae's Law shows that Indo-Iranian had this triad still preserved (and probably accompanied by a newly created $*T^h$) and the fusion of both voiced classes is a secondary and later feature of Iranian; The old Indo-European triad $*T, *D, *D^h$ was still retained in Indo-Iranian regarding the number of opposition members, plus the addition of the newly formed Indo-Iranian $*T^h$. However, for IE $*D^h$, we assume a different phonetic value in Indo-Iranian, namely $*\Delta$, as shown below. Later, in Iranian, IE $*D$ and $*D^h$ merged into a single syllable (Ir. $*D$), and $*T^h$ became a spirant (Ir. $*\Theta$). In Indo-Iranian, on the other hand, the phonemic status of IE

⁷ For the given clusters and their OIA outcomes, see Appendix I.

⁸ For the given clusters and their Avestan outcomes, see Appendix II.

⁹ Here, we are setting aside unique outcomes of the root $\sqrt{dh\bar{a}-}$ 'put' as: pr. imp. *dhattá(na)*, impf. *ádhattam*, etc., areexceptions in otherwise regular OIA developments.

¹⁰ These symbols are used purely algebraically and used here only to distinguish between three modal classes.

* D^h was reshaped to complement the new Indo-Iranian * T^h as a new fourth member in a system of oppositions based on voicing and aspiration.

- ii. Iranian Δz from IE * $D^h s$ represents an older state of arts; Indic outcome Ts for the same input is a later levelling according to the regressive neutralization (similar neutralization of Bartholomaeian clusters appears in Iranian as well as variants to the Bartholomaeian development); hence both clusters * $D^h t$ and * $D^h s$ were subject to Bartholomae's Law.

Table 3

InIr	t-	s-	d^h -
-T/D	Tt	Ts	Dd^h
- D^h	Dd^h	Dz	Dd^h

NB: For simplicity, we leave the question of the fricativization of the left plosives (of the dental and old palatovelars series) aside at this moment, just stating that:

- i. the development of dentals was already the Late Indo-European and Indic state of arts (with the left dental plosive) is a secondary archaization, not an older state of arts;
- ii. the development of palatovelars was already common for all *satəm*-languages.

3. Previously used models of Bartholomae's Law

As noted above, the progressive direction of Bartholomae's Law goes contrary to the prevailing tendency of Indo-European (and Aryan as well) clusters to be assimilated in a regressive manner (note that the outcomes of the Law are often later analogically levelled on 'regular' regressive outcomes – regularly in Indic for clusters * $D^h S$ to point out a very remarkable example, however very often analogical regressive outcomes are present in Avestan beside regular progressive outcomes, according to Bartholomae's Law).¹¹

The law was first described by Bartholomae (1882), who later returned to it many times (Bartholomae 1883: 48; Bartholomae 1885: 206; Bartholomae 1895-1901: 21-23), and the law was repeatedly investigated, revalued and remodelled since. For further references to older literature, see especially Collinge 1985: 7-11 and Mayrhofer 1986: 115-118; Szemerényi 1990: 106-109; Mayrhofer 2004: 46).

Bartholomae stated that the result of the concatenation of any left voiced aspirated obstruent and any right voiceless unaspirated obstruent would be a cluster of a voiced and a voiced aspirated obstruent (including aspirated sibilant), schematically: * $D^h T > *DD^h$, * $D^h S > *DZ^h$. His description only observes the inputs and outputs; there is no detailed process model.

Other authors proposed different models:

- i. Anderson (1970: 388) assumes two phases: in the first, a cluster of two voiced aspirated plosives are created, and the second phase is a deaspiration of the first plosive ($D^h T > D^h D^h > DD^h$);

¹¹ Cf. IE $ts > OIA ts$, Av. $0s$; IE $d^h s > OIA ts$, Av. $0z$; IE $Ks > OIA k\check{s}$, Av. $0\check{s}$; IE $g^h s > OIA k\check{s}$, Av. $0\check{z}$.

- ii. the deaspiration as a second step of the whole process is accepted by Schindler (1976), who assumes that an obstruent becomes aspirated (and inherently voiced) after a voiced aspirate, though other authors assume that Indian aspirates are of biphonemic nature (cf. Ejerhed 1981);
- iii. Sag (1974: 593) states there is a paradox: Bartholomae's law (and subsequent deaspiration) should, according to him, precede Grassmann's Law in case of *bhot-sya-* but Grassman's Law should precede Bartholomae's Law in case of *buddha-* (also cf. Sag 1976);
- iv. Mey (1972) forms a complex of processes, where a deaspiration with a subsequent devoicing before an obstruent goes through a series of shifts of inter-exclusive operations;
- v. D. G. Miller (1977) assumes the influence of the root structure on the process, considering the voicing process as a primary trajectory, followed by the aspiration as a later process;
- vi. Lombardi (1991: 140) tries to explain the unexpected voicing of the right obstruent and the transfer of aspiration to it as 'spreading of the entire Laryngeal node', i.e., by aspiration of the whole cluster;
- vii. Kobayashi (2004: 117-125) speaks about the 'aspiration throw-back', using the instrumentality of the Optimality theory and following the morphemic structure of clusters;
- viii. De Angelis (2006) recalls older Schindler's opinion (Schindler 1976: 629), assuming that the input cluster $*D^hT$ aims to preserve the aspiration by shifting it on the left plosive. Again, this model is based only on Indic data and does not explain why the assumed shift of aspiration on the $*T$ is accompanied by the shift of voice, especially since Indic has T^h , the possible cluster hence could avoid, if there is any need for the 'shift of aspiration', the basic least marked form is $\dagger TT^h$, not attested DD^h .¹²

Previous models often focus only on OIA data, and thus only on clusters $*D^hT$, and therefore usually omit the parallel cluster $*D^hS$ (since its outcome in the Indic is 'regular regressive' TS , unlike in the Iranian). Similarly, they usually ignore parallel clusters $*TD^h$ and $*D^hD^h$, both sharing the same outcome with $*D^hT$ -clusters (i.e., Indic DD^h , Iranian DD), which makes them a functional background for Bartholomae's Law (the same outcome is the result of two processes in opposite directions).

As we can see, the typically used model generally assumes a shift of aspiration from the left plosive to the right plosive, accompanied, if considered at all, by various more or less complicated processes and a shift of voice. Such models are implausible, even twice: aspiration and voicedness are **marked** values of obstruents and unaspirated and voiceless are, on the contrary, unmarked values, and the typical assimilation of these values proceeds in the opposite direction, i.e. from marked to non-marked and in a regressive direction.

¹² Again, cf. Šeřčik (2012) shows that OIA $*T^h$ is never synchronically neutralized or created, unlike other modal classes of plosives.

4. The proposed alternative model

The reconstructed phonetic value of IE and/or Indo-Iranian $*D^h$ needs to be re-evaluated and clarified.¹³ In the following lines, we will use IE $*D^h$ as a purely algebraic sign without any comments on its properties in Indo-European. The traditionally reconstructed IE ‘voiced aspirates’ are realized in Indic as breathy voiced plosives,¹⁴ in Iranian, they are merged with plain voiced plosives (similarly as in Celtic and Balto-Slavic). However, the voicedness is the essential property of Indo-Iranian $*D^h$ (as we can assume for Celtic, Balto-Slavic and even Germanic and Armenian but not for Proto-Greek or Italic).

We assume that IE $*D^h$ was realized in Common Indo-Iranian as a voiced spirant $*\Delta$, not as an aspirated voiced stop. This idea was suggested already by von Brücke (1856: 59-60), later also by Walde (1887: 466), Prokosch (1918-1919; Prokosch 1939: 39-41) and Hammerich (1967: 839-849), although not specifically for the Bartholomaeian clusters but in general for IE $*D^h$ in any position.¹⁵

Our proposed model for the development of the IE $*D^h t / *D^h s \parallel *TD^h / *D^h D^h$ clusters (the first pair is Bartholomaeian, and the second is parallel to it) follows the trajectory of two steps: the early spirantization of the IE $*D^h$ in Indo-Iranian on $*\Delta$ in all positions and the subsequent processes of further assimilations and lenitions in clusters. To the development of individual clusters:

1. We assume the following trajectories for $*D^h T$ clusters with the following steps:
 - a. the left IE plosive (= $*D^h$) being an Aryan voiced spirant (Δ) caused the following t to become also a voiced spirant;
 - b. in the second phase, both spirants became a subject of fortition to plosives; the left spirant became a voiced plosive, the right spirant changed into a voiced aspirate ($\Delta\Delta > DD^h$)¹⁶ in Indic,¹⁷ both plosives are realized as unaspirated plosives in Iranian:

- | | |
|---|-----------|
| i. IE $*D^{h+T} > \Delta+T > \Delta\Delta > DD^h$ | (Indic) |
| ii. IE $*D^{h+T} > \Delta+T > \Delta\Delta > DD$ | (Iranian) |

¹³ For the phonetic value of IE $*D^h$ cf. Kümmel (2012: 293), who successfully argued against ‘voiced aspirated’ value. From the phonemic point of view, the triad $T - D - D^h$, though many times attacked as ‘typologically improbable’ (cf. Jakobson 1958: 22-23 and Hopper 1973: 141), is well attested in Madurese, Kelabit and probably also in Bintulu (cf. Blust 2009: 174-175, 182).

¹⁴ The phonetic value of Indo-Aryan D^h is “breathy voiced”, but phonologically, the position of D^h is clear: it is in the proportional opposition to T^h as T is to D (i.e., the opposition of voice), and as much in the proportional opposition to D as T is to T^h (i.e., the opposition of aspiration). Moreover, breathy and aspirated stops are indeed acoustically similar in that there is a delay in the onset of full voicing. Thus the phonetic proximity between breathy phonation and aspiration is apparent.

¹⁵ Brixhe (1997) assumes that Paleo-Balkan languages (including Proto-Greek!) underwent the change IE $*D^h > *\Delta$.

¹⁶ We assume, similarly to D.G. Miller (1977), that voice was a primary quality, not aspiration.

¹⁷ Either directly due to the same process or later, Walde (1897) assumes aspiration as a later feature for OIA and Greek aspirates.

2. *Simili modo*, the trajectories for the development of the IE $*D^hS$ (InIr. $*\Delta S$) clusters are modelled with steps:
- the left voiced spirant caused the left sibilant also to become voiced;
 - the intermediate ΔZ cluster became a plosive in the left part of it in Iranian; TS replaces the expected $\dagger DZ$ due to analogy with regressive clusters in Indic, the Iranian state is assumed to be archaic, hence:

- IE $*D^h+S > \Delta+S > \Delta Z$ ($\rightarrow TS$) (Indic)
- IE $*D^h+S > \Delta+S > \Delta Z > DZ$ (Iranian)

NB: The spirantization model of Bartholomae's Law has one prominent advantage concerning the development of $*D^hS$ clusters: within the spirantization model, there is no need to introduce the 'exotic' voiced aspirated sibilants (Z^h) at all.

The development of both analogical clusters can be modelled in the following way:

3. For the development of IE $*T/D+D^h$ cluster, we simply assume that:
- the left plosive took the voice and is spirantized due to the right Δ ($<$ IE $*D^h$);
 - both spirants were subject to a fortition both in Indic and Iranian:

- IE $*T/D+D^h > T+\Delta > \Delta\Delta > DD^h$ (Indic)
- IE $*T/D+D^h > T+\Delta > \Delta\Delta > DD$ (Iranian)

4. The development of $*D^hD^h$ clusters we model as follows:

- an Aryan left voiced spirant (= IE $*D^h$) forms a homorganic cluster with a right voiced spirant;
- in the second phase, both spirants became a subject of fortition into plosives; a left spirant became a voiced plosive, the right spirant changed into a voiced aspirate ($\Delta\Delta > DD^h$) in Indic, the right plosive is unaspirated plosive in Iranian:

- IE $*D^h+D^h > \Delta+\Delta > DD^h$ (Indic)
- IE $*D^h+D^h > \Delta+\Delta > DD$ (Iranian)

The fortition of Indo-Iranian voiced spirants on plosives is significantly rarer than lenition from the typological point of view but not impossible. Here, we have to mention the fortition of loanwords in Goidelic. Even in Indic, we have modern synchronic alternations of $*\Delta$ and $*D^h$ in Gujarati: intervocalic $/b^h, g^h, d^h/$ have variants $[\beta, \gamma, \delta]$ (Masica 1991: 103). Similarly, in Marathi, there is a tendency to spirantize postvocalic $/b^h, d^h/$ and intervocalic $/j^h/$ (Lambert 1943). The phonetic differences between D^h and Δ almost negligible and phonologically unusable: there is no Indic language with both classes together, though Sindhi and Siraiki have another series of implosives) (cf. Masica 1991: 103; Ladefoged & Maddieson 1996: 57-60, 83). Generally, aspiration is very unusual with fricatives (and more often with sibilants than spirants). In Younger Avestan, there is a synchronic alternation between voiced fricatives and stops ($\Delta \sim D$); this process can

be both an innovation or a preservation of the older state. Especially for Indic is fortition of fricatives, even the synchronic process, affecting OIA sibilants, which regularly change to plosives before IE **s/š* (see Appendix 3 for examples).

NB: The development of clusters **TT*, **TS* is without any special features of interest for our current research.

NB: De Angelis (2006) proposed that the paradigmatic pressure from Bartholomae's Law forced all IE clusters of two voiced dentals **ddh* to remain as such, with only two exceptions with inserted *z*, namely *dehi*, *dhehi* (< **d̥dh*). However, our model does not require any inserted sibilant within the two-dental clusters, assuming the first plosive spirantization in both Bartholomaeian and non-Bartholomaeian clusters.

5. Conclusions

We therefore conclude with the following statements:

- i. the progressive direction of the Bartholomaeian Law is not in opposition to the regular regressive development of plosives: the voiced spirants were subject to their assimilation process that requires each adjacent plosive of a voiced spirant, either from left or from right, to be assimilated to a voiced spirant. The Bartholomaeian outcomes are then not exceptions in the regular regressive development of plosives since plosives do not trigger them, although they were affected them;
- ii. both Indic and Iranian outcomes with voiced plosives are later innovations resulting from a later parallel fortition, not the inherited Indo-Iranian phonemes. The Indic outcomes with voiced and voiced aspirated plosives are not results of a further dissimilation; the left spirant was never 'aspirated', hence could not lose an aspiration. The Iranian outcomes with a single voiced plosive are also the later innovation; the attested existence of voiced spirants as allophones of voiced plosives in Avestan can be an indirect proof of the older existence of voiced spirants;
- iii. suppose IE **D^h* was a voiced spirant and not an aspirated voiced plosive (a phoneme which does not phonetically exist as such!). In that case, we do not have to assume the existence of any exotic **DZ^h* clusters as Bartholomaeian outcomes in the Common Indo-Iranian period both in IE dental and palatovelar series. The aspirated sibilants do exist, cf. Amerindian (mutually unrelated) Siouan language Ofo (/s^h/ and /f^h/), and in the (central?) Chumash languages (/s^h/ and /f^h/) usually voiceless (*S^h*). There is no need to shift an aspiration and create only positional aspirated sibilant if there is no aspiration at all;
- iv. the process of fricative fortition, though rather rare, is well documented in Indic for IE sibilants (**s/š*) and palatovelars (probably this is also the reason why IE **Tt* is always OIA *Tt*, unlike other Indo-European languages).

Summarizing: the exceptional development of Bartholomae's Law is not unique at all if we consider the development of its parallel clusters. There were no shifts of aspiration or creation of specific and exotic voiced aspirated sibilants; the whole process is just a part of the development of clusters containing voiced spirants without regard to their relative *right-left* position.

Appendix i: the Indic outcomes

Table 4

Indic	*t-	*s-	*d ^h -
-*t/d	tt	ts	(d)d ^h
-*d ^h	dd^h	<i>ts</i>	dd ^h
-*k/ǵ	sʈ	kʂ	(d)d ^h
-*ǵ ^h	0d^h	<i>kʂ</i>	0d ^h
-*k/g	kt	kʂ	gd ^h
-*ǵ ^h	gd^h	<i>kʂ</i>	†gd ^h
-*p/b	pt	ps	†bd ^h
-*b ^h	bd^h	<i>ps</i>	†bd ^h

NB: Bartholomaeian outcomes are marked in **bold**. Outcomes due to a secondary levelling of originally Bartholomaeian clusters are marked *cursive*. Directly unattested outcomes are marked by †. Examples of clusters resulting from *T/Dt, *T/Ds are willingly omitted.

Examples of Bartholomae's clusters (*D^ht, *D^hs):

- pr. *inddhé*, ppp. *iddhá-* (√*idh-* 'kindle'; cf. pr. *indháte*, *indhaté*; < IE *√*H₂eǵd^h-*; cf. Gr. αἶθω 'I kindle'; cf. Whitney 1885: 8; MacDonell 1916: 371-372; IEW: 11-12; EWAi II: 267; LIV²: 259);
- ppp. *baddhá-*, gd. *baddhvā*, ft. *bhantsyáti* (√*bandh-* 'bind'; cf. pr. *badhnáte*; < IE *√*b^hend^h-*; cf. Goth. *band* 'bond'; cf. Whitney 1885: 105; MacDonell 1916: 400; IEW: 127; EWAi II: 208; LIV²: 75);
- ppp. *buddhá-*, ao. *ábhutsi*, fut. *bhotsáti* B (√*budh-* 'wake'; cf. pr. *bódhati*; < IE *√*b^heud^h-*; cf. Gr. πρῶθουαι 'I give notice', OCS *bljudo* 'beware'; cf. Whitney 1885: 106-107; MacDonell 1916: 400-401; IEW: 150-152; EWAi II: 233-235; LIV²: 82-83; NIL: 36-37);
- ppp. *yuddhá-*, gd. *yuddhvī*, pr. *yótsi*, des. *yúyutsati* (√*yudh-* 'fight'; cf. pr. *yúdhate*; < IE *√*H₁ieud^h-*; cf. OL *ioubē* 'I command'; cf. Whitney 1885: 133; MacDonell 1916: 410; IEW: 511-512; EWAi II: 418-419; LIV²: 225-226);
- pr. *lédhi* B (√*lih-* 'lick'; cf. caus. *leháyati*; < IE *√*leiǵ^h-*; cf. Gr. λείχω, OCS *ližo* 'I lick'; cf. Whitney 1885: 148; MacDonell 1916: 414; IEW: 668; EWAi II: 463; LIV²: 404);
- ppp. *rūdhá-*, gd. *rūdhvā*, ao. *rukṣās*, *árukṣat*, fut. *rokṣyáti* B, ds. *rúrukṣati* (√*ruh-* 'ascend'; cf. pr. *róhati*; < IE *√*H₁leud^h-*; cf. Gr. Hom. ἦλθον 'I came'; cf. Whitney 1885: 143-144; MacDonell 1916: 414; IEW: 306-307, 684-685; EWAi II: 467-469; LIV²: 248-249; NIL: 245-246);
- ppp. *ūdhá-*, inf. *vódhum*, ao. *ávākṣur*, fut. *vakṣyáti* (√*vah-* 'carry'; cf. pr. *váhati*; < IE *√*ueǵ^h-*; cf. L *uehō*, OCS *vezō* 'I carry'; cf. Whitney 1885: 157; MacDonell 1916: 417; IEW: 1118-1120; EWAi II: 535-537; LIV²: 661-662);
- ppp. *rabdhá-*, ds. *rípsate* B (√*rambh-* 'grasp'; cf. pr. *rábhate*; < IE *√*lemb^h-*; cf. Gr. λάφωρα 'spoils of war'; cf. Whitney 1885:136; MacDonell 1916: 411; IEW: 652; EWAi II: 434-435; LIV²: 411-412); etymologically the same root as the following one;

- ppp. *labdhá-*, gd. *labdhvā*, ds. *álapsata*, fut. *lapsyāti*, des. *lipsate* AV, ps. *lipsyáte* B ($\sqrt{\text{labh-}}$ ‘take’; cf. pr. *lábhate*; < IE $*\sqrt{\text{lemb}^h-}$; cf. Gr. *λάφῶρα* ‘spoils of war’; cf. Whitney 1885: 145-146; MacDonell 1916: 414; IEW: 652; EWAi II: 434-435; LIV²: 411-412);
- ppp. *dabdhá-*, ds. *dípsati* ($\sqrt{\text{dabh-}}$ ‘harm’; cf. pr. *dábhati*; < IE $*\sqrt{\text{d}^h\text{eb}^h-}$; cf. Hitt. *tepnuzzi* ‘downsize’, Lith. *dóbiu* ‘invalidate’; cf. Whitney 1885: 70; MacDonell 1916: 388; IEW: 240; EWAi II: 694-696; LIV²: 132-133; NIL: 85-86).
- prc. *dhaktám* ($\sqrt{\text{dagh-}}$ ‘reach to’; cf. pr. *daghmyāt* _B; < IE $*\sqrt{\text{d}^h\text{eug}^h\text{H}_2-}$; cf. Gr. Hom. *φθάνω* ‘I come first’; cf. Whitney 1885: 69; MacDonell 1916: 388; IEW: 250; EWAi I: 691; LIV²: 134-135);
- ppp. *dagdhá-*, ao. *ádhākṣīt*, fut. *dhakṣyāti* ($\sqrt{\text{dah-}}$ ‘burn’; cf. pr. *dáhati*; < IE $*\sqrt{\text{d}^h\text{eg}^h-}$; cf. Lith. *degù* ‘I burn’; cf. Whitney 1885: 71; MacDonell 1916: 388-389; IEW: 240-241; EWAi I: 712-713; LIV²: 133-134);
- pr. *dógdhi*, *dugdhé*, ao. *ádhukṣata*, *dhukṣata* ($\sqrt{\text{duh-}}$ ‘milk’; cf. pr. *duhánti*; < IE $*\sqrt{\text{d}^h\text{eug}^h-}$; cf. Gr. *τεύχω* ‘I make ready’, OE *ge-dýgan* ‘overcome’; cf. Whitney 1885: 76; MacDonell 1916: 390; IEW: 271; EWAi I: 747-748; LIV²: 148-149).
- Examples of parallel (non-Bartholomaeans) clusters ($*T/DD^h$, $*D^hD^h$):
- pr. *addhí* ($\sqrt{\text{ad-}}$ ‘eat’; cf. pr. *ádmi*; < IE $*\sqrt{\text{H}_1\text{ed-}}$; cf. Hitt. *ēdmi*, L *edō* ‘I eat’; cf. Whitney 1885: 3; MacDonell 1916: 370; IEW: 287-289; EWAi I: 61-62; LIV²: 230-231; NIL: 208-220);
- pr. *viddhí* ($\sqrt{\text{vid-}}$ ‘find’; cf. pr. *vindāti*; < IE $*\sqrt{\text{ueid-}}$; cf. L *uīdī* ‘saw’, Arm. *egit* ‘found’; cf. Whitney 1885: 159-160; MacDonell 1916: 418; IEW: 1125-1127; EWAi II: 579-581; LIV²: 665-667; NIL: 717-722);
- pr. *dehí*,¹⁸ *daddhí* ($\sqrt{\text{dā-}}$ ‘give’; cf. pr. *dādāti*; < IE $*\sqrt{\text{deH}_3-}$; cf. Gr. *δίδωμι*, L *dō* ‘I give’, OLith. *duosti* ‘give’; cf. Whitney 1885: 71-72; MacDonell 1916: 388-389; IEW: 223-225; EWAi I: 713-715; LIV²: 105-106; NIL: 60-69);
- pf. *didiḍdhí* ($\sqrt{\text{diś-}}$ ‘point’; cf. pr. *diśātu*; < IE $*\sqrt{\text{deik}^k-}$; cf. L *dīcō* ‘I say’; cf. Whitney 1885: 73; MacDonell 1916: 389; IEW: 188-189; EWAi II: 744-746; LIV²: 108-109);
- int. *nenigdhí* ($\sqrt{\text{nij-}}$ ‘wash’; cf. ao. *ánijam*; < IE $*\sqrt{\text{neig}^n-}$; cf. Gr. *νίζω* ‘I wash’, OIr. *-nenaig* ‘wash’; cf. Whitney 1885: 90; MacDonell 1916: 395; IEW: 761; EWAi II: 54; LIV²: 450; NIL: 519-520; NIL: 660-661);
- ao. *áyugdham* ($\sqrt{\text{yuj-}}$ ‘join’; cf. pr. *yuñjánti*; < IE $*\sqrt{\text{ieug-}}$; cf. L *iungō* ‘I harness’, OCS *igo* ‘yoke’; cf. Whitney 1885: 132-133; MacDonell 1916: 410; IEW: 508-510; EWAi II: 417-418; LIV²: 316; NIL: 397-404);
- pr. *indhvám* ($*\text{-dd}^h$)¹⁹ ($\sqrt{\text{idh-}}$ ‘kindle’; cf. pr. *indháte*; < IE $*\sqrt{\text{H}_2\text{e}i\text{d}^h-}$; cf. Gr. *αἶθω* ‘kindle’; cf. Whitney 1885: 8; MacDonell 1916: 371-372; IEW: 11-12; EWAi II: 267; LIV²: 259);
- pr. *bodhí* ($*\text{-dd}^h$) ($\sqrt{\text{budh-}}$ ‘wake’; cf. pr. *bódhati*; < IE $*\sqrt{\text{b}^h\text{eud}^h-}$; cf. Gr. *πεύθομαι* ‘I give notice’, OCS *bljudō* ‘I am beware’; cf. Whitney 1885: 106-107; MacDonell 1916: 400-401; IEW: 150-152; EWAi II: 233-235; LIV²: 82-83; NIL: 36-37);

¹⁸ From $-d+d^h$, output is simplified instead of the expected *dadd^hi* or *ded^hi* (= $-0d^h$).

¹⁹ However, clusters nCC of this type are often simplified independently.

- ao. *yodhi* (*-dd^h-) (√*yudh*- ‘fight’; cf. pr. *yúdhyate*; < IE *√*H₂yeud^h*-; cf. OL *ioubē* ‘I command’; cf. Whitney 1885: 133; MacDonell 1916: 410; IEW: 511-512; EWAi II: 418-419; LIV²: 225-226);
- pr. *dhehi*²⁰ (√*dhā*- ‘put’; cf. pr. *dádhāmi*; < IE *√*d^heH₁*-; cf. Gr. τίθημι ‘put’, OLith. *dest(i)*; cf. Whitney 1885: 82; MacDonell 1916: 392-393; IEW: 235-239; EWAi I: 783-786; LIV²: 136-138; NIL: 99-117);
- ao. *volhām*, *vođhvām* (√*vah*- ‘carry’; cf. pr. *váhati*; < IE *√*ueg^h*-; cf. L *uehō*, OCS *vezq* ‘I carry’; cf. Whitney 1885: 157; MacDonell 1916: 417; IEW: 1118-1120; EWAi II: 535-537; LIV²: 661-662).

Appendix ii: the Iranian outcomes

Table 5

Iranian	*t-	*s-	*d ^h -
-*t/d	st	0s	zd
-*d ^h	zd	0z	zd
-*k'/g	št	0š	žd
-*g ^h	žd	0ž	†žd
-*k/g	xt	xš	gd
-*g ^h	gd	γš	†gd
-*p/b	pt ²¹	fš	bd
-*b ^h	bd	βž	†bd

NB: Directly not attested outcomes are marked in *cursive*. The non-Bartholomaeian outcomes parallel to the Bartholomaeian are not listed. Directly not attested outcomes are marked by †. In the examples, outcomes of clusters resulting from *T/Dt, *T/Ds are willingly omitted again.

Examples of Bartholomae's clusters (*D^ht, *D^hs):

- pr. OAv. *dazdā* but without Bartholomae's Law: YAv *dasta* (√*dā*- ‘put’; cf. impf. YAv. *ādadat*; < IE *√*d^heH₁*-; cf. Gr. τίθημι ‘I put’, OLith. *desti* ‘put’; cf. IEW: 235-236; Kellens 1995: 29; LIV²: 136-137; Cheung 2007: 45-46);

²⁰ From *-d^h+d^h*, output is simplified instead of the expected *dadd^hi* or *ded^hi* (= *-0d^h-*).

²¹ This outcome is unusual and unexpected, since we can expect †*ft*. It is a matter of debate, if attested *pt* is an archaism or re-archaization. The Avestan development of the cluster *Pt* is irregular, not only in comparison to the development of the analogous clusters but also in other Iranian languages, since Av. *hapta* ‘seven’ has the Pahlavi and New Persian counterpart *haft* (< OIranian **hafta*). The question is whether Avestan *pt* is an archaism, or whether it represents an innovation (despirantization/occlusivization), since, in Avestan, we encounter the following forms of *pitar-* ‘father’: nom. sg. OAv. *ptā*, *tā*, YAv. *ptā*, *pita*, dat. sg. OAv. *fəδrōi*, *pisrē*, YAv. *pisre*. The form *tā* is easy to be explained as the result of development from **ftā* (i.e., *pt* > *ft* > *ht* > *0t*) but Hoffmann and Forssman (1996: 94) assume the direct simplification of the word-initial *pt* > *t*). Beekes (1988: 73) and Hoffmann & Forssman (1996: 94) otherwise reckon with the preservation of inherited *pt*, contrary to Reichelt (1909: 40), whereas for eastern dialects of Iranian Kümmel (2007: 65) assumes partial restitution of the spirants **f*, **θ*, **χ* by the aspirates *p^h*, *t^h*, *k^h*, which partially, however, can be considered as original according to Morgenstierne (1942; also cf. Lipp 2009a: 158-160 with further references).

- ppp. OAv. *və̀rə̀zda-* ($\sqrt{\text{vard-}}$ ‘grow’, OAv. pr. *varədaitī*; < IE $*\sqrt{H_{\mu}eRd^h}$ -; cf. OIA *várdhate* ‘they grow’; cf. IEW: 1167; Kellens 1995: 51; LIV²: 228; Cheung 2007: 208);
- ppp. OAv. *bazda-* but without Bartholomae’s Law: YAv. *basta-* ($\sqrt{\text{band-}}$ ‘bind’; cf. ps. YAv. *bandaiiatati*; < IE $*\sqrt{b^h\text{end}^h}$ -; cf. OIA *bandhati*, Goth. *bindan* ‘bind’; cf. Kellens 1995: 37; LIV²: 75-76; Cheung 2007: 4-6);
- ppp. YAv. *niuruzda-* but without Bartholomae’s Law: YAv. *urusta-* ($\sqrt{\text{raud-}}$ ‘grow bigger’; cf. pr. *raodahe*; < IE $*\sqrt{H_1\text{leud}^h}$ -; cf. Gr. Hom. ἤλυθον ‘I came’; cf. IEW: 306-307, 684-685; Kellens 1995: 59; LIV²: 248-249; NIL: 245-246; Cheung 2007: 193-194);
- (?) pr. YAv. *uruuāza-* ($\sqrt{\text{uruuād-}}$ ‘be proud’; no secure IE cognate; cf. Kellens 1995: 60; Cheung 2007: 438);
- pr. OAv. *gə̀rə̀zdā* ($\sqrt{\text{garz-}}$ ‘complain, pr. OAv. *gə̀rə̀zōi*; < IE $*\sqrt{g^{(u)}eRg^h}$ -; cf. OIA *grhate* ‘he complains’; cf. IEW: 350-351; Kellens 1995: 19-20; LIV²: 187; Cheung 2007: 111-112);
- subs. OAv *važdra-*, YAv. *važdri-* but without Bartholomae’s law: ppp. YAv. *vašta-*, subs. *vaštar-* ‘drag animal’ (?) + ao. YAv. *uzuuažat* ($\sqrt{\text{vaz-}}$ ‘drive’, pr. YAv. *vazaiti*; < IE $*\sqrt{\mu e g^h}$ -; < IE $*\sqrt{\mu e g^h}$ -; cf. L *uehō*, OCS *vezō* ‘I carry’; cf. IEW: 1118-1119; Kellens 1995: 52; LIV²: 661-662; Cheung 2007: 429-432);
- pr. OAv. *aog³dā* but. pr. YAv. *aoxte* ($\sqrt{\text{aoj-}}$ ‘say’; cf. pr. OAv. *aojōi*; < IE $*\sqrt{H_1\mu e g^{(u)h}}$ - (?); cf. Gr. εὔχομαι ‘I pray’, L *uoueō* ‘I vow’; cf. IEW: 348; Kellens 1995: 9; Cheung 2007: 169-170);
- subs. YAv. *dugəd(a)r-*, YAv. *duγδ(a)r-* ‘daughter’ (< IE $*d^h\mu gH_2\text{ter-}$;²² cf. OIA *duhitar-*, Gr. θυγάτηρ, Goth. *dauhtar* ‘daughter’; cf. IEW: 277; NIL: 126-130);
- ds. OAv. *diđrayžō.duiiē* ($\sqrt{\text{dranj-}}$ ‘fix’; cf. caus. *drə̀njaiiēiti*; < IE $*\sqrt{\text{dreg}^h}$ -; cf. Gr. δράσσομαι ‘I grasp’, OCS *drbžō* ‘I hold’; cf. IEW: 254; Kellens 1995: 32; LIV²: 126; Cheung 2007: 76);
- pr. OAv. *pa³rīi-aogžā* ($\sqrt{\text{aoj-}}$ ‘say’; cf. pr. OAv. *aojōi*; < IE $*\sqrt{H_1\mu e g^{(u)h}}$ - (?); cf. Gr. εὔχομαι ‘I pray’, L *uoueō* ‘I vow’; cf. IEW: 348; Kellens 1995: 9, 14; LIV²: 253; Cheung 2007: 169-170);
- subs. YAv. *də̀rə̀βda* ‘bundle of muscles’ (< Iranian $*\sqrt{\text{darb-}}$ ‘join’; < IE $*\sqrt{d^h\text{erb}^h}$ -; cf. Lith. *dirbù* ‘I work’; cf. IEW: 211-212, 257; LIV²: 121; Cheung 2007: 60);
- ds. OAv *diβžaidiīai* ($\sqrt{\text{dab-}}$ ‘deceive’; cf. pr. OAv. *də̀bə̀naotā*; < IE $*\sqrt{d^h\text{eb}^h}$ -; cf. Lith. *dóbiu* ‘subdue’; cf. IEW: 240; Kellens 1995: 27; LIV²: 132-133; NIL: 85-86; Cheung 2007: 42-43);
- subs. YAv. *vaβžaka-* ‘scorpion’ (< IE $*\mu o b^h sā$; cf. L *uespa*, OHG *wafsa*; ‘wasp’ cf. IEW: 1179).

Examples of parallel (non-Bartholomae’s) clusters ($*T/DD^h$, $*D^hD^h$):

- pr. imp. YAv. *dazdi*, OAv. *maq-dazdūm* ($\sqrt{\text{dā-}}$ ‘give’; cf. pr. OAv. *dadē*; < IE $*\sqrt{\text{de}H_3}$ -; cf. Gr. δίδωμι, L *dō* ‘I give’, OLith. *duosti* ‘give’; cf. IEW: 223-225; Kellens 1995: 29; LIV²: 105-106; NIL: 60-69; Cheung 2007: 43-45);

²² From IE $*gH_1t$, probably merged with $*g^h t$ already before the Common Indo-Iranian period, since the first plosive was deaspirated according to Grassmann’s Law, hence IE $*gH_1t > *g^h t$.

- inf. OAv. *vōizdiiāi*, ao. OAv. *frauuōizdūm* ($\sqrt{\text{vid-}}$ ‘know’; cf. pf. OAv *vaēdā*; < IE $\sqrt{\text{ueid-}}$; cf. L *uīdī* ‘I saw’, Arm. *egit* ‘find’; cf. IEW: 1125-1127; Kellens 1995: 54; LIV²: 665-667; NIL: 717-722; Cheung 2007: 408-409);
- inf. YAv. *dazdiiāi* ($\sqrt{\text{dā-}}$ ‘put’; cf. impf. YAv. *ādadaṭ*; < IE $\sqrt{\text{d}^{\text{h}}\text{eH}_1-}$; cf. Gr. τίθημι ‘I put’, OLith. *desti* ‘put’; cf. IEW: 235-236; Kellens 1995: 29; LIV²: 136-137; NIL: 99-11; Cheung 2007: 45-46);
- inf. OAv. *āzdiīāi* ($\sqrt{\text{(n)as/š-}}$ ‘reach’; cf. ao. OAv. *nqsaṭ*; < IE $\sqrt{\text{H}_2\text{nek-}}$; cf. Gr. διηκεῖς ‘continuous’; cf. IEW: 316-317; Kellens 1995: 40-41; LIV²: 282-283; Cheung 2007: 183-184);
- inf. OAv. *mərəz̄diiāi* ($\sqrt{\text{marz-}}$ ‘rub’; cf. pr. OAv. *marəzaiti*; < IE $\sqrt{\text{H}_1\text{merǵ-}}$; cf. Gr. ἀμέργω ‘I pluck, pull’; cf. IEW: 722-723; Kellens 1995: 44; LIV²: 280-281; Cheung 2007: 180-182);
- pr. OAv. *mərəngədiiē* ($\sqrt{\text{marc-}}$ ‘destroy’; cf. pr. *mərəṅcaite*; < IE $\sqrt{\text{melk}^{\text{u-}}$; cf. Gr. βλάπτω ‘I damage’; cf. IEW: 737; Kellens 1995: 43; LIV²: 434-435; Cheung 2007: 265-266);
- pr. YAv. *auuanhabdaēta*, caus. YAv. *nix^vabdiīeiti* ($\sqrt{\text{x}^{\text{v}}\text{ap-}}$ ‘sleep’, pf. YAv. *hušx^vafa* < IE $\sqrt{\text{suep-}}$; cf. L *sopiō*, OCS *sępljō* ‘I sleep’; cf. IEW: 1048-1149; Kellens 1995: 17-18; LIV²: 612-613; NIL: 675-680; Cheung 2007: 145-146).

Appendix iii: the development of the $\sqrt{\text{SD}^{\text{h}}}$ clusters in Indic

That Indic was subject to a regular de-spirantization is evident from the development of clusters $\sqrt{\text{SD}^{\text{h}}} > \text{OIA } \text{0D}^{\text{h}}/\text{DD}^{\text{h}}$ (cf. OIA imp. pr. *edhi* = $\sqrt{\text{as-}}$ ‘be’ + *dhi*, OIA imp. pr. *ādhvam* = $\sqrt{\text{ās-}}$ ‘sit’ + *dhvam*; OIA imp. pr. *vividḍhi* = $\sqrt{\text{viṣ-}}$ ‘be active’ + *dhi*, OIA imp. pr. *rīḍhvam* = $\sqrt{\text{riṣ-}}$ ‘be hurt’ + *dhvam*), since root-final sibilant was either lenited (debuccalized and elided) or became a plosive in the position before a voiced plosive. Similarly, in clusters of two sibilants, the root-final usually became a plosive (cf. OIA ds. *jīghatsati* = $\sqrt{\text{ghas-}}$ ‘eat’ + *sa-*, OIA *ávatsyat* v. = $\sqrt{\text{vas-}}$ ‘shine’ + *syā-*; OIA inj. ao. *dvikṣát* = $\sqrt{\text{dviṣ-}}$ ‘hate’ + *sá-*; OIA pr. *vivekṣi* = $\sqrt{\text{viṣ-}}$ ‘be active’ + *si*).²³

Avestan preserved the original left sibilant, which was lost before a following sibilant, this state of arts is an archaic feature, replaced by a new creation in Indic.

Trajectories we assume for the development of these clusters are:

- | | |
|--|-----------|
| ia. S + D ^h > ZΔ > iD ^h | (Indic) |
| ib. S + D ^h > ZΔ > ΔΔ > DD ^h | (Indic) |
| ii. S + D ^h > ZΔ > ZD | (Iranian) |
| | |
| i. S + S > Θs > TS | (Indic) |
| ii. S + S > SS > 0S | (Iranian) |

²³ OIA *ási* from $\sqrt{\text{as-}}$ is probably the old IE simplification of clusters, cf. L. *es*. OIA *śāssi* = $\sqrt{\text{sās-}}$ + *si* is a unique example of the (restituted?) cluster.

Examples:**Indic:**

- pr. *edhī* (√*as-* ‘be’; cf. pr. *ásat*; < IE *√*H₁es-*; cf. Gr. ἐστί, L *est* ‘is’; cf. Whitney 1885: 5; MacDonell 1916: 370-371; IEW: 340-341; EWAi I: 144; LIV²: 241-242; NIL: 235-238);
- pr. *ādhvam* (√*ās-* ‘sit’; cf. pr. *āsāthe*; < IE *√*H₁eH₁s-*; cf. Hith. ēsa, Gr. ἵσται ‘sits’; cf. Whitney 1885: 6-7; MacDonell 1916: 371; IEW: 342-343; EWAi II: 181; LIV²: 232);
- pr. *śādhi*, pf. *śaśādhi* (√*śās-* ‘order’; cf. pr. *śāsmi*; < IE *√*keHs-*; cf. Alb. *thom* ‘say’; cf. Whitney 1885: 172; MacDonell 1916: 423; IEW: 533; EWAi II: 632-633; LIV²: 318-319);
- pf. *vividhī* (√*viṣ-* ‘be active’; cf. pr. *viveṣah*; < IE *√*ueis-* 3; cf. Whitney 1885: 161; MacDonell 1916: 419; EWAi II: 585-586; LIV²: 672);
- ao. *rīḍhvam* TA (√*riṣ-* ‘be hurt’; cf. pr. *rīṣyati*; < IE *√*(H₁)reis-*; cf. Whitney 1885: 140; IEW: 859; EWAi II: 462; LIV²: 505);
- ds. *jīghatsati* AV (√*ghas-* ‘eat’; cf. pf. *jaghāsa*; < IE *√*g^(wh)es-*; cf. OAv. *aγžōnuuamna-* ‘not consumable’; cf. Whitney 1885: 42; MacDonell 1916: 381; IEW: 452; EWAi I: 514; LIV²: 198-199);
- co. *āvatsyat* B (√*vas-* ‘shine’; cf. ao. *avasran*; < IE *√*ues-*; cf. Lith. *aūšti* ‘break dawn’; cf. Whitney 1885: 155-156; MacDonell 1916: 417; IEW: 86-87; EWAi II: 530-532; LIV²: 292-293; NIL: 357-367);
- ao. *dvikṣát*, *dvikṣata* AV (√*viṣ-* ‘hate’; cf. pr. *dvéṣat*; < IE *√*dueis-*; cf. OAv. *d^{ai}bišəntī*; cf. Whitney 1885: 81; MacDonell 1916: 392; IEW: 228; EWAi I: 770-771; LIV²: 131);
- ao. *apikṣan* ŚB (√*piṣ-* ‘crush’; cf. pf. *pipéṣa*; < IE *√*peis-*; cf. Lith. *pisù* ‘I copulate’, OCS *pxxomъ* ‘I pushed’; cf. Whitney 1885: 97-98; MacDonell 1916: 398; IEW: 796; EWAi II: 169; LIV²: 466-467);
- pr. *vivekṣi*, fut. *veksyāti* (√*viṣ-* ‘be active’; cf. pr. *viveṣah*; < IE *√*ueis-* 3; cf. Whitney 1885: 161; MacDonell 1916: 419; EWAi II: 585-586; LIV²: 672).

Iranian:

- pr. OAv. *zdī* (√*ah-* ‘be’; cf. pr. OAv. *ahmī*; < IE *√*H₁es-*; cf. Gr. ἐστί, L *est* ‘is’; cf. IEW: 340-341; Kellens 1995: 10-11; LIV²: 241; Cheung 2007: 151-152);
- ao. OAv. *θrāzdūm* (√*θrā-* ‘protect’; cf. YAv. pr. *θrāiēnte*; < IE *√*treH-*; cf. OIA *trāyate* ‘he protects, saves’; cf. IEW: 1075; Kellens 1995: 27; LIV²: 646; Cheung 2007: 394);
- inf. OAv. *sazdiiiāi*²⁴ (√*sənh-* ‘declare’, pr. YAv. *saṅhaite*; < IE *√*kens-*; cf. L *cēnsēō* ‘I judge’; cf. IEW: 566; Kellens 1995: 62; LIV²: 326; Cheung 2007: 334-335);
- ao. OAv. *θβarōzdūm* (√*θβars-* ‘cut’; cf. pr. YAv. *θβarəsaiti*; < IE *√*t_uers-* (?); cf. IEW: 1102; Kellens 1995: 26; LIV²: 656; Cheung 2007: 399-400);
- pr. (ao.?) OAv. *cīzdī* (√*ciš-* ‘assign’; cf. pr. OAv. *cīsmahī* < IE *√*k^eeis-*; cf. OIr. *ad-cí* ‘see’; cf. IEW: 637; Kellens 1995: 22-23; LIV²: 381-382; Cheung 2007: 30);
- inf. OAv. *būzdiiāi* (√*būš-* ‘endeavour’; < IE *√*b^heuH₂s-*; cf. Lith. *būs* ‘it will be’; cf. IEW: 146-147; Kellens 1995: 39-40; LIV²: 98-101; Cheung 2007: 25-26);

²⁴ This form can be from √*sand-* ‘appear’, cf. Cheung (2007: 334), but it seems to be doubtful. Kellens lists it as derived from √*sənh-* ‘declare’ without any doubts (Kellens 1995: 62).

- part. inch. YAv. ($\nu\bar{r}$)*usaitī-* f. ($\sqrt{vah-}$ ‘shine’, < IE $\sqrt{ues-}$; cf. Lith. *aūšti* ‘break dawn’; cf. IEW: 86-87; Kellens 1995: 53; LIV²: 292-293; Cheung 2007: 202);
- ppp. (?) YAv. *ustriamna-* (= $us-\sqrt{stər-}$ ‘throw down’; < IE $\sqrt{ster-}$; cf. L *prosternō* ‘cause to fall’; cf. IEW: 1029-1030; Kellens 1995: 64; LIV²: 597-598; Cheung 2007: 363-364);
- pr. inch. YAv. *tusən* ($\sqrt{tuš-}$ ‘be empty’; cf. pr. caus. YAv. *-taošaiieiti*; < IE $\sqrt{teus-}$; cf. OCS *тъшъ* ‘empty, vain’, Lith. *tūščias* ‘empty, poor’; cf. IEW: 1085; Kellens 1995: 26; LIV²: 642; Cheung 2007: 388-389).

Abbreviations

ao.	= aorist	inch.	= inchoative
co.	= conditional	inf.	= infinitive
ds.	= desiderative	int.	= intensive
fut.	= future	pf.	= perfect
gd.	= gerund	pr.	= present
imp.	= imperative	ppp.	= preterit passive participle
impf.	= imperfect	subs.	= substantive

Languages

Alb.	= Albanian	OAv.	= Old Avestan
Arm.	= Armenian	OCS	= Old Church Slavonic
Av.	= Avestan	OE	= Old English
Goth.	= Gothic	OIA	= Old Indo-Aryan
Gr.	= Greek	Olr.	= Old Irish
Hitt.	= Hittite	OL	= Old Latin
Hom.	= Homeric	OLith.	= Old Lithuanian
IE	= Indo-European	OP	= Old Persian
L	= Latin	YAv.	= Young Avestan
Lith.	= Lithuanian		

Symbols

D	= voiced unaspirated plosive	T	= voiceless unaspirated plosive
D ^h	= voiced aspirated plosive	T ^h	= voiceless aspirated plosive
Δ	= voiced spirant	Θ	= voiceless spirant
S	= voiceless sibilant	Z	= voiced sibilant
S ^h	= voiceless aspirated sibilant	Z ^h	= voiced aspirated sibilant

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First preliminary report on the project for a new Cushitic comparative dictionary

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Abstract: The paper reports about the start of the joint research project by the two authors for the 4th attempt at composing the comparative dictionary of all Cushitic languages.

Keywords: comparative and historical linguistics, lexicography, linguistic reconstruction, etymology, Afro-Asiatic, Cushitic languages.

Dedicated to the blessed memories of
Aharon Dolgopolsky (1930-2012) and
Marvin Lionel Bender (1934-2008),
Authors of a few giant steps of
Cushitic and Omotic lexical comparison

Introduction

The Cushitic languages, in the current classification,¹ represent the fourth branch of the immense Afro-Asiatic macrofamily beside (1) Semitic, (2) Egyptian, (3) Berber, (4) Omotic and (5) Chadic. According to several lexicostatistical-glottochronological

* This paper is to hallmark the 30th anniversary of the collaboration between both authors, whose correspondence on Afro-Asiatic etymologies has started in March 1994.

¹ Established by J.H. Greenberg (1955, 1963) and modified by M.L. Bender (1975) adding Omotic.

calculations, Cushitic has been multiply corroborated as one of the earliest branch to have split off from the Afro-Asiatic parental community.²

Since none of the Cushitic languages were written in ancient times and Cushitic lexical items were only very scarcely recorded in ancient Egyptian sources,³ they are only known as spoken today or in the best case from the records of the past one and a half century made mostly by European linguists, which is why the historical linguistic reconstruction of the Cushitic lexicon has approximately similar importance and chances as, e.g., in the Fenno-Ugric (Uralic) language family (first attested sporadically in medieval Hungarian).

The *communis opinio* has divided Cushitic in four equipotential subbranches: (1) northern (Bed'awye of the nomadic Beja tribes located along the Red Sea coastline from Eritrea up to Egypt), (2) central (Agaw in Ethiopia), (3) East Cushitic (the biggest one, spread across Ethiopia, Somalia, Kenya), (4) Southern Cushitic (where several daughter languages are either extinct or endangered on the border of Kenya and Tanzania, the southernmost extremity of the entire macrofamily).

Previous Cushitic lexicons

So far three common Cushitic lexicons of a similar scope, albeit fundamentally diverging in their approach and nature of their methodology, have been published.

The pioneering milestone was set by A.B. Dolgopol'skij (Moscow), the co-founder mastermind of the Muscovite school of historical linguistics, whose ground-breaking *Sravnitel'no-istoričeskaja fonetika kušitskich jazykov* ("Comparative-historical phonology of the Cushitic languages", usually abbreviated SIFKJa, where Omotic was included also as not yet treated as a separate branch at that day) has appeared in 1973 after a hole decade of comparative research on the Cushitic lexicon (starting in the early 1960s), where he has first demonstrated a system of regular consonantal correlations through hundreds of reconstructed Cushomotic lexical items, whose principal weakness is that, following the convention since L. Reinisch, the Viennese giant of Ethiopian field research and the supreme authority of Cushomotic linguistics for many decades, numerous distinct roots were forced together in one entry, while Dolgopol'skij immediately targeted to set up Proto-Cushomotic forms without first establishing the corresponding forms of the intermediate phases at the younger diachronic levels, e.g., Proto-Agaw vs. Proto-East Cushitic or Proto-Somaloid vs. Proto-Highland East Cushitic. Later on, esp. after his

² Already I.M. D'jakonov (1975) has pointed out by lexicostatistical means Cushitic (handled at that day yet as one branch with Omotic) to have branched off PAA as the first back in the 8th mill. BC.

³ Cf., e.g., the exceptionally ancient occurrence (probably the oldest one at all in the history Cushitic, of the Somali term for "frankincense" in the Egyptian texts as Ḥntj.w (earliest attestation in Dyn. IV, cf. *ÄWb* I 279b, a special innovative formation of Somali, which is nowhere else attested in Cushitic, from Ecu. *ṣan- "milk"), which was discovered by L. Reinisch (1902: 61 and 93) and then thoroughly demonstrated by G. Banti and R. Contini (1997: 175, 184), cf. also Takács (2014, coll. 8b-9b). Another old Cushitic trace ("only" some half of a millennium younger than the above one) has been detected among the dog names in the Middle Egyptian inscription of king Antef II (of Theban Dyn. XI, ca. 2100 BCE), cf. Kossmann 2011 (with further literature).

alياهو (1976), Dolgopolsky himself abandoned his 1973 proto-forms and exploited the new results in reconstructing the Cushitic subbranches by H.-J. Sasse (1979) and Ch. Ehret (1980) for his milestone studies establishing some regular consonantal correspondences between East Cushitic and Egypto-Semitic (Dolgopolsky 1983 and 1988) as well as Southern Cushitic and Egypto-Semitic (Dolgopolsky 1987).

The circumstances for this latter approach have substantially bettered by the time when Ch. Ehret (UCLA) launched the second enterprise at a “Proto-Cushitic Reconstruction” (1987), which has greatly benefited from the epoch-maker progress in reconstructing the parental phonology and lexicon of Agaw by D. Appleyard (1984), of East Cushitic by P. Black (1974) and especially by H.-J. Sasse (1979) and of Southern Cushitic by Ch. Ehret (1980), although the latter work has rightly been blamed for little semantical rigour in establishing cognate pairs, which makes precisely the South Cushitic column of his comparative lexicon (where Omotic was excluded) less reliable and the weakest piece of chain in the whole work, which otherwise challenges to be used with care even today.

The third attempt was done by M.L. Bender somewhere between 2003-7,⁴ but the outcome had had to be long awaited (posthumously ed. by G. Hudson in 2020), where Bender followed the lexostatistic strategy of identifying cognacy without an emphasis on setting up too many complicated common proto-forms which in the indices suggest an utterly minimalistic conception of the parental Cushitic consonantal inventory. He, as usually in other comparative lexicons of his also, was working with selected semantical items of (mostly) the basic lexicon for achieving cognate pairs and their consonantal correlations and so a great deal in the vocabularies of the compared languages do not show up, while the entries are arranged in the alphabetic order of the selected English meanings.

Needless to say that all three attempts at Proto-Cushitic greatly differ in reconstructive methodology and, as a consequence, their results also. Each tool has its pros and cons and their progressive features complement one another. What makes the first attempt unchallenged in this context is Dolgopol’skij’s unique collection of comparative data (which only sometimes has to be re-arranged) and the true (not distorted or re-formatted) presentation of all the forms quoting directly the authentic sources with author names, while his original vision, first formulated in his SIFKJa, about a refined system of Cushomotic sibilant affricates (that must be modified within Cushitic vs. Omotic on several points) has underlied the new model of Afro-Asiatic phonology⁵ as demonstrated in the

⁴ Which can be dated from the completion of his Omotic comparative lexicon (2003) until his premature passing away (in Jan. 2008), after which G. Hudson managed to overtake and edit Bender’s practically complete manuscript.

⁵ A.Ju. Militarev and O.V. Stolbova (1990: 45), successors of Dolgopol’skij in the Diakonovian dictionary team in a way, have expressed their view on this original vision of “the phonological principles of Afrasian reconstruction” in their talk on their “First approach to comparative-historical phonology of Afrasian (consonantism)” delivered for the Viennese Afro-Asiatic Congress (1987) as follows: “The funny thing about them is that A. Dolgopolsky’s brilliant hypothesis on Proto-Cushitic consonantism, he does not seem to insist upon any more, were among stimulating initial impulses in our work. What was not always well sustained in Cushitic has paradoxically proved more promising for Common Afrasian.”

revolutionary Afro-Asiatic comparative vocabulary (SISAJa I-III) by the team of I.M. D'jakonov a decade later. The highly fruitful exploitation of the Cushitic sublevel (Agaw, East and South Cushitic) reconstructions as well as the daring conception of the Cushitic parental consonantism (equally figured with a few sibilant affricates, only otherwise as in SIFKJa) make Ehret 1987 even today an unparalleled rich (over 640 entries with no semantical restrictions) and attractive inventory of Proto-Cushitic roots which approached the closest towards the maximally possible score of his day in this respect (it is only a pity that in 3 columns out of the 4, i.e., in Agaw, East and South Cushitic, mostly asterisked were only quoted, sometimes difficult to check back without the underlying real forms in the daughter languages). The comparative analysis of selected (mostly) basic semantemes in by Bender (2020) Cushitic has yielded reliable bases for certain lexicostatistical and glottochronological calculations instead of a comprehensive inventory of all the Cushitic roots one might possibly isolate.

The new comparative Cushitic project

Regarding the enumerated achievements as well as deficiencies of the three pioneering works, without which our present agenda would be unthinkable, one can presumably easily imagine the requirements we are to state as most fundamental *sine qua non* about the new Cushitic comparative dictionary:

(1) First and foremost, it should represent an as complete and encyclopaedic thesaurus of all the lexical items that occur at least in two Cushitic subbranches and are not originating from some recent borrowing (e.g., from Ethio-Semitic), whereby they may be reliably used for reconstructing an older common Cushitic heritage.

(2) In an appendix, in addition, all the lexemes should also be presented that only occur (for the time being) in one subbranch but do not appear to be a loanword and so that these may also be exploited in later interbranch comparison.

(3) All the lexical data should be quoted in their authentic forms, referring to the sources where these may be checked back, with the necessary comments (if needed) as for orthographical, transcriptional peculiarities or phonetic realization.

(4) The compared forms should adhere to regular consonantal correspondences whose establishment may reliably only be elaborated and achieved by a careful comparison of the essence drawn from the results by the three predecessors with our own research results. In each individual etymological entry, any change deviant from the expectable correspondence should be remarked and possibly commented on in special (foot)note. The lexical material should be arranged according to the smaller units headed preferably by the adequate sublevel proto-form. If the sporadic attestation of the compared forms does not make the cognacy evident, additional elucidation on the supposed intermediate phonological shifts is required. In case of an alternative etymology, special comment should be adduced in a footnote for the introduction and a brief discussion of the problem, which should result in an annotated apparatus attached to each entry or disputed form. Each etymological entry has to begin with a Proto-Cushitic form to which all previous suggestions by other authors should be adduced in a footnote.

As an outcome, an A-Z thesaurus, representing the whole of the immense Cushitic lexical heritage in thoroughly annotated and footnoted entries, is expected by both co-authors, namely Václav Blažek (VB) and Gábor Takács (GT), who have shared the domains of their responsibility as follows:

Bed'awye or Beja

In the parts of Beja Etymological Dictionary VB has done his best for an exhaustive documentation from the beginning of the 19th cent. till the present (Blažek 2003a, 2003b, 2005a, 2006, 2007, 2013b, 2020, 2021, 2023). VB supposes that, for a comprehensive tool like our Cushitic Comparative Dictionary, it is not that practical to quote all records for the same item and so VB would chose the best transcribed examples, e.g. 2-3, with full documentation of their sources covering the same item.

Agaw

Although D. Appleyard has basically established Proto-Agaw over some two decades of publishing his research results (1984-2006), this was in fact achieved by comparing the lexical evidence for certain semantical items from selected daughter languages as recorded by selected field researchers, complemented by VB with additional Agaw daughter languages and sources on the basis of a 100 wordlist for lexicostatistical purposes (Blažek 2006-2007a; 2014: 299-315), which GT intends to complete by all missing semantical items and available records as well as emend the previous comparisons on certain points in the manner of his pilot study (Takács 2012).

East Cushitic

Concerning the East Cushitic part of the Cushitic comparative dictionary, VB has planned a maximum transparent pattern organized according to individual subgroups: 0. East Cushitic protoform, I. Afar-Saho, II. Somaloid, III. Galaboid, IV. Oromoid, V. Dullay, VI. Highland East Cushitic, VII. Yaaku. VB would like to quote all adequate examples from all described languages, always with sources. In case of multiple sources for the same lexeme, the more precisely transcribed example should be preferred. In the case of semantic dispersion in various sources, all examples from one and the same languages should be quoted (frequently it is the case of “big” languages as Oromo, Somali, Afar-Saho, Sidamo with richer documentation). It was Paul Black in his dissertation (1974) who initiated the application of the standard comparative method to the East Cushitic languages. Thanks to his field research, he had at his disposal fresh data from Konso and D'irayta, two archaic Oromoid languages. His results were developed by Hans-Jürgen Sasse in a series of articles (1973, 1974, 1975, 1976, 1979) and crowned by his *Etymological dictionary of Burji* (1982), where he significantly expanded the

number of reliable Proto-East Cushitic reconstruction. Let us mention that Sasse newly described Dasanech (= Galab) and Burji languages. He also had an experience in diachronic Indo-European linguistics and was able to apply its principles to the comparative East Cushitic linguistics. In Sasse's *Etymological dictionary of Burji*, he included numerous comparisons identified by Dick Hayward, whose contribution to East Cushitic comparative linguistics was much more extensive as he published both descriptive and comparative studies devoted to the Dullay group (1978, 1989), Bayso (1978-9), D'irayta (1981), Afar (1985, co-authored by E. Parker) and Arbore (1984, 1988). Another scholar who shifted the level of reconstruction in the field the East Cushitic languages, namely of the group 'Sam' called by the author himself, was Bernd Heine (1976, 1978, 1981, 1982). Extraordinarily important are his comparative descriptions of Elmolo (1980) and especially Yaaku (1975). Challenged by Ch. Ehret & M. N. Ali's (1984) Proto-Somali based on the comparative survey of the Somali dialect for certain lexical items, the very useful reconstruction of Proto-Somali Marcello Lamberti (1986) was based on the same languages as Heine's Proto-Sam was (Somali dialects, Jiddu, Boni, Rendille). His daring alternative theory on labiovelar correlations in Cushitic-Omoti (Lamberti 1988) is, however, rather hard for us to follow. Grover Hudson (1989) reconstructed a considerable part of the Highland East Cushitic protolanguage, including a rich lexical documentation according to English semantical items, collecting all possible forms for these items from the daughter languages including those not underlying any of the reconstructed items. Chris Ehret (1991) proposed his own conception of reconstructing Proto-East Cushitic phonetics, preceded by his attempt to reconstruct the Common Cushitic protolanguage (1987). He tried to expand the number of ejective consonants in both his East and Common Cushitic reconstructions. These ideas of Ehret have been further developed by Linda Arvanites in her dissertation (1991), devoted to the Proto-East Cushitic reconstruction. Taking into account all these attempts at reconstructing East Cushitic, we prefer the approach of Hans-Jürgen Sasse as the most convincing and reliable one. In addition, VB has published several studies mapping the selected partial (basic) lexicons of some individual East Cushitic groups (Somaloid, Dullay, Oromoid etc.) in a comparative context (2001, 2006-2007b, 2010, 2011; with Jan Záhorský 2008).

Southern Cushitic

No doubt, Ch. Ehret's (1980) pioneering phonological and lexical reconstruction of this southernmost, lexically pretty intact, subbranch of the entire Afro-Asiatic phylum requires fundamental revision for long known⁶ methodological reasons. This unique vocabulary, whose 100-item comparative wordlist has been re-arranged by VB on the basis of Ehret 1980 along with other sources for lexicostatistical purposes (Blažek 2005b; 2019: 45-88), has been since 1998 under permanent reconstruction by GT, who has released since then a whole series of papers and volume chapters on the exceptionally archaic traits of Southern Cushitic consonantism with a great number of newly reconstructed

⁶ Cf., e.g., the assessment by R. Hetzron & E.P. Tólos (1982).

lexical items (Takács 1999-2011). In addition, over the past many years, an entirely re-written and re-arranged Southern Cushitic comparative root dictionary has been on schedule by GT based on a comprehensive survey and re-evaluation of all the available lexical materials, to become an etymological dictionary, with due respect to the achievements so far in the comparison and reconstruction of the best studied West Rift languages (Whiteley 1958, Elderkin & Maghway 1992, Kießling 2002, Kießling & Mous 2004), which are being re-examined in constant contrast with East Rift, Ma'a and Dahalo (the other well-described lexicon of the subbranch). Although GT is aware of the recent dispute over the classification of the latter two languages, before drawing any hasty conclusions, he maintains the exploitation of their lexical treasure definitely displaying characteristic features of Southern Cushitic or Rift especially regarding the fine distinction of the labial triad (*b-, *p-, *f-) and their laterals (extinct from East Cushitic).

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Preliminary report on the project for an Etymological dictionary of the Angas-Sura group of Chadic languages

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Abstract The brief report announces the current work on the forthcoming first two fascicles of an etymological dictionary elaborating the Afro-Asiatic background of a Chadic language group, one of the first ones in this genre in the history of Chadic linguistics.¹

Keywords: African linguistics, Afro-Asiatic, Chadic, etymology.

Introduction

The languages of the Angas-Sura group, spoken between the South-Eastern Plateau and the Benue river, Plateau State of Nigeria. belong to the West Chadic subbranch of

¹ The primacy belonging, in a way at least, to N. Skinner's (1996) *Hausa comparative dictionary* (Cologne, 1996, Köppe) which, however, lists *comparanda* in and outside Afro-Asiatic in the manner of J.H. Greenberg's „mass comparison” *ad hoc*, without elaborating the consonantal correspondences. Others out of the 27 (!) Chadic groups have mostly not even been researched even for an internal reconstruction, let alone for the elaboration of their etymological dictionaries with all the Afro-Asiatic cognates etc. So far, the comparative lexicons and (sometimes) historical phonologies have only appeared for the following groups: Angas-Sura (Takács 2004) with pilot studies on their Afro-Asiatic background (see fn. 6 below), Bole-Tangale (Schuh 1984), Northern Bauchi (Skinner 1977 and Takács 2002) with some external etymologies by the present author (Takács 2002, 2007), Southern Bauchi (Shimizu 1978), Mafa-Mada (Rossing 1978), all in all just 5 (!) Chadic groups, while efforts have been made to globally reconstruct West Chadic (Stolbova 1986-7) and Central Chadic (Gravina 2014) also, though both attempts suffer from fundamental difficulties of coherence regarding their historical phonologies surely to be reconsidered in the light of additional data.

the Chadic branch, which, in its turn, represents part of the Afro-Asiatic (Semitic-Hamitic) language family (or phylum), divided since the third quarter of the 20th century into six equipotential cognate branches thanks to the fundamental results of J. Lukas & J.H. Greenberg on Chadic² and M. L. Bender & H. C. Fleming on Omotic,³ resp., namely: (1) Semitic, (2) Egyptian, (3) Berber, (4) Cushitic, (5) Omotic, (6) Chadic.

Some minor segments of the phonological and lexical reconstruction of the Angas-Sura group had only been partly elaborated in pioneering studies by J. H. Greenberg, C. Hoffmann and O. V. Stolbova⁴ in the second half of the 20th century before the first comprehensive comparative lexicon of Angas-Sura has been published by G. Takács (2004)⁵ that also only offers a purely internal reconstruction without going beyond the frontiers of Angas-Sura.

The new project

Over the past two decades, on the basis of that comparative dictionary, I have discussed thousands of external cognates of the Angas-Sura lexical stock both inside its gigantic Chadic kindred and in the remote branches of the Afro-Asiatic macrofamily in my series of papers “Angas-Sura etymologies”, whose majority has appeared on the pages of this journal.⁶ Using these materials with numerous *addenda et corrigenda* re-

² Who were the first scholars to claim the Chadic languages to belong together in a separate branch of Afro-Asiatic.

³ The two American Ethiopianists were both the pioneers of Omotic comparative linguistics establishing their internal classification as well as the isomorphs and the isoglosses indicating their special status in contrast to the Cushitic languages which they were both the first ones to recognize.

⁴ Thus, J.H. Greenberg (1958) surveyed the Angas-Sura roots beginning with labials pointing out the original labial triad *b - *p - *f inherited from Afro-Asiatic. O.V. Stolbova devoted two studies to the subject, using basically the Angas (Foulkes 1915, Ormsby 1913-4) and Sura (Jungrauthmayr 1963) lexicons for the comparison adducing some additional data from Chip, Montol, Gerka (collected and published by Jungrauthmayr 1965). In 1972, she proposed a historical-comparative survey of the Proto-Angas-Sura consonant system in the light of some illustrative lexical material (2-3 exx. for each correspondence). In her 1977 paper, O. V. Stolbova presented 256 lexical roots and Proto-Angas-Sura reconstructions accompanied by a brief sketch of vowel correspondences. C. Hoffmann (1975 MS) offered a phonological (both consonantal and vowel) reconstruction of the Proto-Angas-Goemai level (on the basis of Goemai, Mernyang, Sura, and Angas) through 248 lexical roots. The West Chadic historical phonology by Stolbova (1987: 240-244) also contains a separate list of some 64 Proto-Angas roots.

⁵ My research on the Afro-Asiatic background of the Angas-Sura lexicon began back in September 1998 during my first research at the Haifa University under the guidance of the late Prof. A. B. Dolgopolsky (1930-2012), may his memory be blessed, one of the greatest Afro-Asiatic or Semito-Hamitic comparativists of all times.

⁶ First part (roots with initial *b-) in *Lingua Posnaniensis* 46 (2004), 131-144. Second part (*b-) in *Rocznik Orientalistyczny* 57/1 (2004), 55-68. Third issue (*p-) in *Lingua Posnaniensis* 48 (2006), 121-138. Fourth part (*f-) in *Folia Orientalia* 47/2 (2011), 273-289. Fifth part (*m- in monoconsonantal roots) in *Cahiers Caribéens d’Égyptologie* 13-14 (2010), 137-142. Sixth part (rest of *m-), originally scheduled for *Rocznik Orientalistyczny* 74/1 (2021), has so far not been completed and submitted. Seventh part (*d-) in *Lingua Posnaniensis* 62/3 (2020), 95-120. Eighth part (*d-) in *Folia Orientalia* 57 (2020), 321-354. Ninth part (*t-) in *Lingua Posnaniensis* 63/1 (2021), 53-72. Tenth part (*z- + Ø or

sulting from most recent new sources on the Angas-Sura daughter languages as well as from my ongoing research on other Afro-Asiatic groups in the frames of my current project for the micro-reconstructions in Southern Afro-Asiatic,⁷ I am currently working on the reformed etymological entries for the Angas-Sura lexical items with initial labials and dentals to achieve a new synthesis going into the first two separate volumes of the planned „Etymological dictionary of the Angas-Sura group of Chadic languages”.⁸ As my research for collecting comparative evidence with initial sibilant and velar consonants in my quarter-of-a-century old Afro-Asiatic root catalogue progresses these years, systematically dealing with further segments of the Angas-Sura lexical stock will also be facilitated for hopefully updating or elaborating all the relevant etymological entries for the next two fascicles.

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labials or dentals or velars) in *Lingua Posnaniensis* 64/1 (2022), 73-96. Eleventh part (*z- + nasals) in *Lingua Posnaniensis* 64/2 (2022), 49-76. Twelfth part (*z- + liquids) in *Lingua Posnaniensis* 63/2 (2021), 56-75. Thirteenth parts with AS *z- + liquids (continued) in *Lingua Posnaniensis* 65/2 (2023), 83-102.

⁷ My research for the micro-reconstruction of the consonantal system and the lexical stock in every single individual group of the neglected Southern Afro-Asiatic branches (Cushitic, Omotic, Chadic) has begun back in the 1990s with a new look on a reformed Southern Cushitic reconstruction (first addressed in my lecture delivered in Trieste in April 1998) as well as with my start to collect comparative data of Angas-Sura (Haifa, September 1998). In course of the next decades, this approach of mine has been extended onto Omotic (since 2019) and further Chadic groups as well, namely: Northern Bauchi (since 2005), Mafa-Mada (since 2021), Musgu and Masa (both since 2020), Dangla-Migama and Mubi-Toram (both since 2008). These long-range projects of mine have been currently generously supported by a research fellowship offered by the University of Łódź. I am greatly indebted to Prof. Krzysztof Tomasz Witzczak (Department of Classical Philology, University of Łódź) for encouraging and supporting me to successfully apply for the ARR grant of his home university, in the frames of which also this volume has been completed thanks to the immense paper-based apparatus, i.e., the Egyptian etymological word and Afro-Asiatic root catalogues, established in 1994 and 1999, resp., of the unique Lexicographical Library of Afro-Asiatic Root Research at Balatonederics (LLAARR).

⁸ The author gratefully acknowledges the permanent intellectual and moral support of the Associazione Internazionale di Studi sul Mediterraneo e l'Oriente of Roma (ISMEO) also over the past years, whose membership is hoped to facilitate also the material background of the new publication.

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Kupchik, John 2023. *Azuma Old Japanese: A comparative grammar and reconstruction* (Trends in Linguistics. Documentation 40). Berlin–Boston: De Gruyter Mouton. Pp. XXXIV + 522

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There are three key reasons why the very cover and title page of the book under review¹ here caught this writer’s eye: (1) the term *Azuma*, (2) the glottonym *Old Japanese*, and (3) the name of the author of the book. Actually, this writer has been familiar with all the three “lexical items”, yet it was spotting them together on the cover of a volume just released that triggered not only the present text but also an irresistible impulsion to have the book at hand on the shelf of his own library along with standing there other works of primary importance focusing on, or related to, Old Japanese. Astonishingly (or rather *not* astonishingly²), the date of publication of almost all of these works starts with <20> and almost all of them are either authored (~ coauthored) by Alexander (“Sasha”) Vovin or in some other way (acknowledgements of academic supervision or support, citations, references, polemics, etc.) associated with him.

In the second edition of his Western Old Japanese (WOJ) grammar (2020:20), he wrote that “[...] there are *very few general descriptions* of the” WOJ “language grammar published even in Japanese. Surprisingly enough, *none* of these descriptions *is complete*”³; he briefly characterized only one such grammar and three⁴ “much shorter works” (*ib.*) to

¹ Addressed, in the first place, to “general linguists” who are interested in results presented in such works, but not engaged or specializing in, or unrelated to, Japanological research.

² See Kupchik et al. 2021, especially “Biography ...” IX-XIV, “List of Publications...” XV-XXIX, *Tabula Gratulatoria* XXX-XXXIII, “Acknowledgements” XXXIV, and “Introduction” (by Kupchik, 1(-2)).

³ *Italics* afm for the purposes of this review; Vovin’s 2020 grammar expands over 1339 pp.

⁴ Actually two (Umetomo Saeki 1933 and Noriyuki Shirafuji 1987), the former republished in “several new and enlarged and improved editions” which “can be used as a very good introduction to Old Japanese, but [...] it still remains too sketchy in many details” (*ib.*). The only grammar, described as “the main and the most detailed” but “accessible only to the people who have mastered Classical Japanese” (*ib.*) was Yoshio

conclude his short survey with the sentence “There is only one general grammatical sketch of Old Japanese written in a Western language (Syromyatnikov 1972)” (*ib.*, 21)⁵.

The “only” Western-language sketch referred to above does but mention dialect differentiation: “Records of the 8th century do not reflect all the dialects, but mainly the Central Western and, to some extent, the Eastern [...] In the present work, Eastern dialectal features are rendered sporadically because of lack of space” (Syromyatnikov 1981:13⁶). “Mention[ing] just the *most fundamental ones*” among writings with Eastern Old Japanese in the focus of their authors’ attention, Vovin & Ishisaki-Vovin (2022: IX, also 483-4, 486-7) specifically refer to four such works, three by “Japanese” scholars (Yoshisuke Fukuda 1965, Tadao Hōjō 1966, and Yoshiharu Mizushima 1984) and only one by “Western” scholar: John Kupchik (2011).

The latter is a really fundamental and monumental, also in size (over 1050 pp.), PhD dissertation, considered “unpublished”⁷ in Vovin & Ishisaki-Vovin 2022: 486 despite being globally e-accessible. The title announces “a grammar of *Eastern Old Japanese dialects* [plural]”. Interestingly, all the three other works by Japanese authors referred to by the Vovins as “fundamental” include the word *Azuma* in their titles⁸. The lexeme itself is quite tricky. Generally, it is a proper noun~name, personal and geographic~topographical, and historical. As an *anthroponym*, it can function as a family name written in a number of “untypical~unusual ways” (the most frequent being 東, but also 吾妻, あずま, 吾孀, 阿妻, 我妻, 阿室, 安部間, 阿部摩, 四阿), or its constituent (like e.g. in *Azumai* 東井, *Azumaji* 吾妻路~東路~東道~東地, *Azumaya* 東家~東谷~東屋, *Azumana-*

Yamada’s “History of the Nara period grammar” of 1913 (with “several enlarged and corrected editions and many reprints”; Vovin also warns that “Yamada’s grammar does not really differentiate between Western and Eastern Old Japanese, treating them as if they were data from the same language”, although Yamada was aware of the grammatical differences (*ib.* also p. 1242).

⁵ A very competent opinion: the “Western language” in this case is Russian, Vovin’s native tongue. It was published in English translation in 1981 (in Bentley’s 2001: 2 opinion, it was “rather poorly translated from the original Russian”).

⁶ In the original (1972: 9): “В памятниках VIII в. отражены не все диалекты, а в основном центрально-западный и частично восточный [...]. В данном очерке по недостатку места восточные диалектизмы приводятся лишь спорадически”.

⁷ In this writer’s opinion, “traditionally”: seemingly, for a larger part of scholars more advanced in years who were professionally active in the pre-internet epoch treating PhD and other degree-dissertations as “unpublished” was obvious, hence using the attribute in reference lists was mechanical. This writer found it not only in the book just quoted. Vovin’s name appears on the title page of Kupchik 2011 as that of <Chairperson of the Dissertation Committee at Hawai’i>, cf. as well “Acknowledgements” (*ib.*, p. iii).

⁸ Fukuda 1965: *Nara jidai Azuma hōgen-no kenkyū* [a study of the Eastern Japanese dialects in the Nara period]; Hōjō 1966: *Jōdai Azuma hōgen-no kenkyū* [a study of the Eastern Japanese dialects]; Mizushima 1984: *Man’yōshū Azuma uta-no kokugogakuteki kenkyū* [a linguistic study of the *Man’yōshū*’s eastern poems]; all readings and translations, with minor cosmetics, taken from Vovin & Ishisaki-Vovin who listed also three other works by Mizushima with similar titles including <*Azuma*>. Evidently the title of the same 1966 work by Hojo (北条忠雄) – 上代東国方言の研究 in the original orthography – was in Kupchik 2011: transliterated as <*Jōdai tōgoku hōgen-no kenkyū*>, although in the case of Fukuda 1964 (奈良時代東国方言の研究) and Mizushima 1984 (萬葉集東歌の国語学的研究) the transliterations of both Vovins 2022: 483 and 487 and Kupchik 2011: 1014 and 1016 are the same. *Nota bene*, for Hojo 1966 both Kupchik 2011 and 2023 indicate different Publisher (Maruzen) than Vovin 2020 and Vovins 2022 (Nihon gakujutsu shinkōkai – the same as indicated on the book in this writer’s eyeshot).

da 東洋), or also as a (masculine) given name (e.g. 東, 吾妻, 雷, or アズマ in comics and for fictitious characters in other arts; see e.g. Nichigai 1990: vol. “family names” 11, 260, 374, vol. “given names” 7-9, 402-3, 550). As a *toponym* it appears (or appeared in the past until recent administrative changes) in names of mountains and volcanoes (e.g. Azumayasan 四阿山 2384 (Gumma), *Azuma kofuji* 吾妻小富士 1707 (Fukushima), Azumayasan 四阿屋山 1387 (Nagano), Azumaneyama 東根山 928 (Iwate), Azumayasan 四阿屋山 771 (Saitama), Azumadake 東岳 684 (Aomori), Azumanesan 東峰山 619 (Iwate), Azumamoriyama 東森山 153 (Miyagi), but also the whole volcanic *Azumayama* 吾妻山 Mountain Range (*Azuma kasan* 吾妻火山 ~ *Azuma rempō* 吾妻連峰)⁹, villages 東村 and towns 東町 (e.g. *Azuma-machi* in Inashiki, Ibaraki, till 2003, also *Azuma-chō* in Izumi, Kagoshima, till 2006) throughout Japan and as a constituent of endemic plant names (like *azumagiku* 東菊 [-*ezogiku* 蝦夷菊] *Aster dubius*; *azumanezasa* 東根笹 *Pleioblastus chino*; *azuma ichige* 東一華 *Anemone raddeana*; *azuma shakunage* 東シヤクナゲ *Rhododendron degronianum*), names of hotels and resorts (like e.g. *Sado Resort Hotel Azuma* on Sado Island or capsule hotel *Ryoma Higashi Azuma* and several others in Tokyo, not to speak of objects like *Hotel Azzun Orient Spa & Wellness* in Mazury Lakeland of north-eastern Poland with Website also in Japanese), boats, warships, even pieces of women’s wear (like footwear *azumageta* 東下駄 or overcoat *azuma kōto* 東コート). Close relations between anthroponyms and toponyms¹⁰ have been observed in very many (perhaps most) among the world’s languages (i.e., probably still less than 20% of them adequately studied, described, and known), hence all the lexemes quoted above in all probability can be treated as hyponyms to be reducible to (or to have their source in) their hyperonym (“common semantic denominator”) being the historical toponym *Azuma* defined by the immortal Edmond Papinot in his *Historical and Geographical Dictionary of Japan* as “the name formerly given to the 15 eastern and northern provinces of Honshū”¹¹. Great Japanese-English *Kenkyusha* dictionaries explain the entry word “Azuma” as “east; East [Eastern] Japan; the eastern provinces; the East land” (4th Edition 1974) and “the Kantō region [but in Japanese as “the old name of the Kantō region”: 関東地方の古称 *Kantō chihō-no koshō*]; Eastern [East] Japan; eastern provinces; *Azuma-no kuni* 東の国 the lands east of the Osaka barrier 逢坂の関より東 *Ōsaka-no seki-yori higashi*; the Kantō region; Eastern [East] Japan; the eastern provinces”. Great dictionaries record also other historical compounds and phrases of interest (not only to linguists) like highly contrasting *azuma-otoko* (東男) and *azuma-ebisu* (東えびす), the former positively underlining

⁹ Examples in part quoted from Tokuhisa et al. 2011: 26-7; numbers indicate elevation above sea level in meters (m.a.s.l.).

¹⁰ Personal names are often associated with names of places where their bearers come from and place names are often associated with the names of their discoverers, founders, owners, etc.

¹¹ P. 43 in the *First* [Charles E.] Tuttle [Company] edition, *Eighth printing* 1984 used. Papinot (1860-1942) related it “etymologically” with the legendary exclamation “*Azuma wa ya!* [吾妻はや <吾妻] ‘ah, ma femme!’”. His dictionary was first published in 1899 in French as *Dictionnaire japonais-français des noms principaux de l’histoire et de la géographie de Japon* and its English version released in 1906 is in consecutive editions and reprints on sale till these days.

masculinity (~machismo), the latter, clearly discriminatory, derogatively implying primitivism, cultural inferiority, barbarousness, hence contempt for persons spoken about¹².

In a very short “Preface” (pp. V-VI; one would definitely welcome its author to be much less economical in his words) to his *Grammar* presented here, and in the initial part of its “Introduction” (1-2), Kupchik defined his understanding of the term *Azuma*, or rather its understanding for the purposes of compiling his grammar (initially planned to be “a book about the phonology and phonetics”, only “later deciding” that it would be better to expand it into a full grammar” (V) – general linguists will be long blessing and praising him for such decision). In his words, the modifier *Azuma* in the glottonym <Azuma Old Japanese> is a toponym: “It should be noted from the outset that” he uses the glottonym (abbreviated to) ““AOJ” as a purely areal term” (1). This reviewer, however, eagerly looks at it as if at a new internationally acceptable language name, like e.g. **Azuman* (an extinct member of *Japonic languages*), on the horizon.

The author of the book returns to the term in the first sentences of the “Introduction”: “The Azuma Old Japanese (...AOJ) dialects were spoken in Japan during the Nara period (8th c. CE) in the eastern region called Azuma that stretched from present-day Shizuoka and Nagano, east to Ibaraki, and all areas between them extending southward to the Pacific. The large northeastern area [...] that covered present-day Fukushima, Miyagi, Iwate, and Aomori” Prefectures “was also included” [...] (p. 1).

The date (1999)/2000 marked not only the turn of the century, and the millennium, but also the turn of the epoch in the history of Western research in/on the oldest attested-recorded stage of what gradually developed into the <modern Japanese language>. The 170 pages of (“only one”) Syromyatnikov 1972 (140 pages in the 1981 English

¹² Both Kenkyusha 4th and 5th editions translate the former as “a man from East(ern) Japan” (“regarded as more manly than those from the area around Kyoto”, 5th, p. 45) and illustrate it with the phrase *azuma-otokoni kyōonna*, translating it “the best men are found in Edo and the best women in Kyoto” and interpreting it “Go to East Japan for manly (masculine) qualities; go to Kyoto for womanly (feminine) beauty” (4th) and “Eastern Japan for manliness; Kyoto for feminine charm” (5th). The latter is translated in Kenkyusha 4th as “savages in the eastern provinces” and the *ebisu* component (noted with the character 夷) in a separate entry is rendered as “barbarian; a savage”; in Kenkyusha 5th it seems to be absent but both editions include the entry *tōi* (東夷) found also in Kenkyusha 2nd edition (here illustrated with two other very interesting historical terms: *tōi seibatsu* 東夷征伐 “the subjugation of the eastern barbarians” and *tōi sei shōgun* 東夷征將軍 “a commander of an expedition against the eastern barbarians; a military commissioner of the barbarian east”) and in many other monolingual (cf. e.g., Kodansha’s 1989:39 elegant explanation of the entry *Azuma ebisu* as 京都の人が東国の武士をさげすんでいった語 ‘a term used by Kyotoites to express looking down upon ~ spurning the warriors of the eastern provinces’) and bilingual (including Nelson and New Nelson, “a must” on the desk of almost every student of Japanese) dictionaries. Both the word *ebisu* and the character 夷 (read *ebisu* or *i*) were in the past predominantly used as ethnonyms for the ‘Ainu’. These, longish and possibly perceived as superfluous, lecture-like elucubrations in this footnote resulted from this writer’s astonishing observation that the historical toponym *Azuma* and its graphic notation as well as terms associated with it were not known even to many graduates in Japanese studies; the astonishment vanished immediately upon finding the absence of not only the appropriate entry in the first volume of the eight-vols. *Kodansha Encyclopedia of Japan* (and its first *Supplement* (1986), too) but possibly even a single occurrence of the term throughout the entire 1983 edition as an inspection of its *Index* would suggest (while the entry “Satsuma Province” *Satsuma-no kuni*, considered in Japanese literature as opposite (at least “phonetically”): *-tsuma~zuma* implied ‘end, edge, verge, fringe, margin, rim, brim, brink, tip, side, shore, extremity, border, frontier, peripheries’) to “Azuma provinces” *Azuma-no kuni*, does have its place in vol. 7). Flash haphazard checking in a number of “histories of Japan”, “dictionaries of Japanese history” included, concluded with the same effect.

translation) mentioned above were replaced by the whole library of bulky publications of fundamental significance for the discipline (like e.g. Bentley 2001, Miyake 2003, Kupchik 2011, Vovin 2009-20, ²2020 (12005/I-2009/II), Vovin & Ishisaki-Vovin 2022, Kupchik 2023 focused on in the present text, Frellesvig & Kinsui 2024) as well as an eruption and proliferation of minor supportive contributions (e.g. Kupchik & Alonso & Miyake 2011:VVIII-XXIV, 5-64; resp. chapters in Frellesvig & Kinsui 2024) and numerous journal articles (e.g., listed in bibliographies attached in the works just mentioned). Research in the field was so intensive that “revised, updated, enlarged”, etc., editions proved necessary within a decade or two (cf. fn. 13).

Kupchik 2023 belongs also to this latter category, being (as expected) a “rewritten” Kupchik 2011. “Looking back on” his “dissertation several years later”, its author “realized it needed many significant revisions, rewrites, and additional analyses” (V). Such a sequence of events, approaches, and receptions of one’s own work should be considered normal and typical in academic biographies and dissertations should be first preprinted for bureaucratic (officious) procedures and a “several years” buffer period before their final much more mature on many obvious reasons) publication proves always beneficial. The author’s “looking back” turned out to be very critical as he openly admits: “There were many typographical errors, topics with insufficient discussion, and my *views on certain aspects the data had evolved or changed completely over time*”. Rewriting involved additions of “a significant amount of new text” and “a few new chapters” but also replacement of “more than 400 pages [cf. the total number of pages mentioned above] of phonological comparison charts” with their summaries¹³, simultaneously reminding readers particularly interested in details about their availability in Kupchik 2011 (*ib.*, *italics* afm.).

The front matter of the book introduced here expands over 34 pages ([I]-XXXIV) and includes *i.a.* “Preface” (cf. above), two tables of contents (the first, IX-XI, standard size, and the other “Extended table of contents”, XIII-XXVIII), “Glossing [and] translation conventions” (XXIX), and “Abbreviations” (“Grammatical Terms”, XXXI-XXXII; “Azuma Old Japanese Provinces /Topolects”, XXXII-XXXIII; “Language varieties”, “Texts”, “Primary Manuscripts”, XXXIII; “Other” (three items), XXXIV). The idea to introduce the two tables of contents is an interesting logistic proposal welcomed and recommended for more frequent application¹⁴ in similar publications: each of them performs a different function¹⁵.

The core of the monograph is organized into ten units (the author calls them “chapters”¹⁶), the first of them being “Introduction” (1-21) which informs on grammatical and

¹³ This reviewer shares in full Kupchik’s opinion that it “would be easier to read and more useful for researchers” (especially those not intending to specialize in studying the history of the Japanese language to whom the present review is addressed in the first place).

¹⁴ But not overuse: probably in a majority of similar cases a good extensive index (or indices) surely is a better, more user-friendly, solution.

¹⁵ And both can be irritating, when only one of them is present and index is meager: while one is too laconic, not informative enough, the other is too time-consuming in use and often purposelessly increases redundancy. See further in this text mentioning the full title of the “Index”.

¹⁶ This reviewer is perhaps too old to get accustomed to treat introductions (also prefaces, conclusions, appendices, etc.), as <chapters> (in his world order, except for <preface>, they follow the <introduction>).

typological features of the language described as well as on its place on the linguistic map and among other -lects of the eighth century Japan, but also on the state of the art in *Azuman* philological and linguistic research. It also defines the “structure and aims” of the book and, since it is to be a grammar of a language (one of the -lects) in use more than a millennium ago, long since extinct but/and preserved in poetry only, briefly explains or informs on sources, manuscripts, versification, metrics, writing system(s) involved, phonetic and phonemic reconstructions, orthography and transliterations, to conclude with specifying the author’s goal – the key terms used are <descriptive grammar> and <reference grammar> (the latter being used in relation to chapters 3 to 10 – “the second section of the book”; 21) – *exactly* what *general* linguistics and linguists are in need of as far as Old Japanese is concerned.

[Chapter] 2 (23-104) constitutes a study of post-Proto-Japanese period sound changes involving reconstructions of several proto-lects (like Proto-Japanese, Proto-Eastern Old Japanese, Azuma Old Japanese topolects) and “numerous protoforms” to propose “a new subgrouping of the Old Japanese dialects” and “a detailed grouping of Eastern Old Japanese topolects. This chapter has many changes and revisions to the reconstruction and analysis presented in Kupchik” 2011 (23). [Chapter] 3 (105-17) entitled “Vowel elision, *rendaku*¹⁷, and assimilations” is also concentrating on phonemics, but the description is synchronic and focusing on Azuman.

[Chapter] 4 (119-42) “Lexicon” devotes about one page (119-20) to the native (Japonic stock) vocabulary, two and half pages (120-2) to Korean, five lines (140) to Chinese, a little over one page and half (141-2) to Austronesian, and eighteen pages (123-40)¹⁸ to Ainu loanwords¹⁹.

What follows is exactly what one expect to find in the first place in any grammar of any language one reaches for to consult. [Chapter] 5 treats “Nominals” ((143-243), sub-grouped into nouns (143-209), pronouns (209-37) and number names (237-43, with classifiers); [chapter] 6 (245-73) describes uninflective adjectives (one example of a reduplicated adjective found, 251) and conjugable “adjectival” verbs (no tense and aspect); [chapter] 7 (277-426), “Verbs” constitutes the longest unit in the book, and no wonder: its first sentence confirms the expected: the verb indeed is “the most morphologically complex” lexical category in the language described – with grammatical categories of *i.a.* negation, aspect, tense, mood²⁰, voice, retrospection, honorification, rich inventory of categorial markers (*i.a.* affixes (292-383), auxiliaries (384-419), reduplication (425-6)). This “reference” part of the grammar ends with three short chapters on, perforce com-

¹⁷ ‘sequential voicing’ 連濁, the voicing of initial consonants in the non-initial components of compound words (e.g. *hitobito* < *hito* + *hito*, *tegami* < *te* + *kami*, *daidokoro* < *dai* + *tokoro*, *benjo* < *ben* + *sho*; in Old Japanese prenasalization was additionally involved).

¹⁸ 75% of the chapter text – the foremost important argument for this reviewer to secure a permanent place for Kupchik’s *Azuman* grammar on one of the more prominently exposed (still not clear, be it “Ainu” or “Japanese”) shelves of his library.

¹⁹ In the case of Ainu, it is a “critical assessment of [Vovin’s] proposals” (123) categorized into toponymic, lexical, and morphological borrowings, and into “plausible (accepted)” and “problematic (rejected)”

²⁰ “Arguably the most notable characteristic of [Azuman] verbs is the rich system of mood markers” (277).

mented lists of: 8 “Adverbs” (427-34, including adverbial constructions), 9 “Conjunctions” (435-40, and “Particles” (441²¹-82).

No special unit for syntax in the book but all relevant information (like primary and secondary word order, verb serialization, reduplications, particle placement) can easily be found in the units presented to readers above.

The final units of the book are: an appendix (“A classification of poems in [*Man'yōshū* poetic anthology] Book 14 based on linguistic features” with 379 footnote comments, 483-509), list of “References” (511-17), and “Index (supplement to the Extended Table of Contents)” (519-22).

To be sure, much more time than that passed since the publication date of the book under review²² and much more experience with staying and getting familiarized with it, consulting it, using for purposes now not to be named, is needed to more adequately and more objectively evaluate and appreciate its usefulness (especially, if its user does not aspire to get deeply involved either in the history of the Japanese language or, say, translating the *Man'yōshū* poetry). Nevertheless, this reviewer's early impressions from closer several hours long inspection of the volume are very positive and promising, the structure of argumentation makes the reading pleasant, and the transparent (often tabularized) presentation of the Azuman linguistic material strengthens the user's trust in its reliability. Definitely, with the release of this Kupchik's grammar we now have at our disposal what we never had before. It elegantly (also visually) complements the recent (21st-century) “whole Old Japanese library” mentioned above: phonetic and phonemic reconstructions, three grammars (Early Old Japanese prose, Western Old Japanese, Eastern Old Japanese), and two dictionaries (Eastern Old Japanese and Ancient Japanese phonograms)²³.

What general linguists are still lacking, however, are – suitable for them – dictionaries of earlier stages of Japanese²⁴.

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²¹ One more quotation: “Particles are a fundamental aspect of the grammar of the [Azuma Old Japanese] dialects. [They] can be separated into seven classes: focus..., emphatic..., question..., restrictive..., desiderative..., ironic..., and quotative particles” (441).

²² Oct. 24, 2023; this text typed May 2024.

²³ We avoid here discussing or listing electronic-only tools, seemingly quite numerous and seemingly not attractive to “non-Japanologist” linguists, like < Bjarke Frellesvig & Stephen Wright Horn et al. (eds.) 2023. *Oxford-NINJAL Corpus of Old Japanese* available at: <http://oncoj.ninjal.ac.jp/>> (probably the best source and tool in the making for Japanologist linguists).

²⁴ Like Old Japanese-to- [Western, e.g. English], but also... Classical Japanese (文語~古文)-to [Western], arranged user-friendly, perhaps with entries arranged like in e.g. standard *Kenkyusha* dictionaries of Contemporary Japanese (transliteration – original orthography – equivalents in translation, preferably with examples and comments) but offering material of e.g. popular and indispensable in Japan 古語辞典 *kogo jiten* ‘dictionaries of Classical Japanese’. The lack of such dictionaries seems unbelievable.

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