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- _ Proto-Berber phonological reconstruction: An update
- _ Harmony and disharmony in Mbat (Jarawan Bantu) verbs
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Proto-Berber phonological reconstruction: An update

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Abstract

Over the last decades, our insights in the phonological history of Berber and the reconstruction of its earlier stages greatly evolved. This is thanks to an emergent discussion and to new data on a number of languages that are crucial to reconstructing Proto-Berber, most importantly the works by Catherine Taine-Cheikh on Zenaga. In this article, I will provide an overview of the results and challenges in the reconstruction of Proto-Berber phonology.

Keywords

Afroasiatic, Amazigh, Berber, phonological reconstruction, Proto-Berber

Résumé

Au cours de ces dernières décennies, les études consacrées à la diachronie de la phonologie des langues berbères ont fait de nets progrès et ce pour deux raisons principales : (i) le développement de débats fructueux et constructifs sur la question et (ii) la publication de nouvelles données sur des langues revêtant une importance cruciale dans la reconstruction du proto-berbère, au premier rang desquelles le zénaga de Mauritanie, illustré notamment par les travaux de Catherine Taine-Cheikh. Dans cet article, je propose une synthèse des résultats déjà obtenus et fais le point sur les défis qui restent à relever pour mieux rendre compte de la phonologie reconstituée du proto-berbère.

Mots clés

afro-asiatique, amazigh, berbère, phonologie en diachronie, proto-berbère

1. Introduction

Historical reconstruction of Berber phonology¹ is still a niche activity in Berber studies. Emphasis has always been on the synchronic description of the different varieties, and on the comparison of their structures. While the latter often has a historical angle (as witnessed, among many others, in Galand 2010), it hardly ever takes the point of view of classical comparative-historical studies. As a result, the major method for reconstructing earlier stages of languages, viz. the systematic comparison of word forms in different languages according to the neogrammarian principles, has hardly any tradition in the field of Berber studies. The reasons behind this may partly be historical and ideological; one may think of the “societal relevance” of language description, rather than comparison, to colonial administration, and the post-independence ideology that all Berber varieties are in principle the same. However, an important reason also lies in the scientific positions taken by its most influential researchers. Especially the late Lionel Galand, while deeply interested in historical linguistics, always remained skeptical to the concept of proto-languages, and thus to the neogrammarian model and its methods. As a result, the systematic reconstruction of Berber phonology never really took off in the main center of Berber studies, Paris, thereby putting Berber in an entirely different situation than other Afroasiatic language groups, such as Semitic, Chadic, and Cushitic. In fact, one finds oneself in the paradoxical situation that one of the lexically and grammatically best described language groups in Africa lacks a serious tradition of historical phonology.

This is not to say that phonological reconstruction has been entirely absent from the field of Berber studies. This is to a large extent due to the work undertaken by one single scholar, Karl-G. Prasse, who, from the late 1950s onwards, undertook a massive endeavor of Berber reconstruction, based on Tuareg. His *A propos de l'origine de h touareg (tahaggart)* (1969) provides us with an analysis of several of the main problems in Berber historical phonology. His later *magnum opus*, the *Manuel de grammaire*

1. I would like to thank Marijn van Putten and Evgenia Gutova, as well as two anonymous referees, for their comments on an earlier draft of this article. Of course, all responsibility for errors and flaws in the argument remains with the author.

touarègue (tāhāggart) (1972-1974) is a bit different, as it is a historical reconstruction couched in the form of a synchronic description. While Prasse made use of Berber data from outside Tuareg, this was not the main focus of his study, and one remarks, for example, that he never analyzed the reflexes of his reconstructed laryngeals in northern Berber.

Thirty years later, I tried to fill in some of these gaps in my *Essai sur la phonologie du proto-berbère* (Kossmann 1999). This work presents full sets of cognates in all Berber languages concerning a number of phonological problems and proposes some reconstructions. Around the same time, a number of other scholars started to work on the same subject, esp. Catherine Taine-Cheikh (cf. already Taine-Cheikh 1999), Marijn van Putten, Lameen Souag, and Cécile Lux. While phonological reconstruction is still relatively marginal in Berber studies, it seems that there is at least something akin to scientific discussion going on nowadays.

Over the last twenty years, our knowledge of Berber has greatly expanded, especially because of the description of a number of hitherto largely unknown varieties. This includes varieties from Morocco (Ghomara, Mourigh 2015), Libya (Awjila, van Putten 2014a, a sophisticated reanalysis of earlier materials; Zwara, Mitchell 2009, the edition of a manuscript from the 1950s), and Egypt (Siwa, Naumann 2012; Souag 2013; Schiattarella 2016). Most importantly, two highly original Berber languages have now received extensive documentation: Zenaga in Mauritania, due to the long series of publications by Catherine Taine-Cheikh, and the closely related Tetserrēt in Niger as described in Lux (2013). Zenaga has proven to be key in our understanding of proto-Berber (Prasse 2011). As a result, our ideas of proto-Berber phonology have changed considerably since the turn of the millennium. Therefore, I think it is useful to provide the reader with an update on the problems and results of Berber historical phonology.

In this article, I will take the basic methods and historical assumptions of Kossmann (1999) as my point of departure. This means, among others, that evidence from Guanche—the extinct language of the Canary Islands—and the language of the antique Libyco-Berber inscriptions fall outside of its scope. I think that the state of our knowledge of these extinct languages makes it more profitable to use proto-Berber reconstructions for their analysis than the other way around. Similarly, no effort will be made to introduce or evaluate the analysis within the larger framework of Afroasiatic reconstructions. While I will try to give due reference to reconstructions made on the basis of Berber-internal data, I will remain

silent on those reconstructions that are mainly based on comparisons with other Afroasiatic languages.² In my view, the time span between a tentatively reconstructed Afroasiatic proto-language and Proto-Berber is too large to allow for a top-down approach, which simply feeds Afroasiatic reconstructions and comparisons into Berber. The term Proto-Berber will be used in the sense of the relatively unitary stage from which the modern dialectal diversity of Berber developed. There are many caveats to this position (see Galand 2010: 14 for a critique; and Múrcia Sánchez 2011: II/359-360 for an alternative scenario), but I doubt that the problems encountered in Berber are much bigger than, for example, those in Proto-Semitic or Proto-Germanic.

Berber languages have undergone enormous influence from other languages. Among the languages for which this influence can be traced, Punic, Latin, and Arabic have had impact on virtually all of Berber. Punic and Latin loans are in most cases phonologically and morphologically indistinguishable from Berber etyma. They can only be traced using our knowledge of these languages and studying the semantic fields to which they belong. Most Arabic loans, on the other hand, are easily set apart on phonological and morphological grounds. There is, however, a small stock of early loans, mainly expressing basic Islamic concepts, that is indistinguishable from native Berber forms on formal grounds. For more information on loanwords in Berber, including references to the large amount of literature on this subject, one may consult Kossmann (2013).

2. Labial consonants

Proto-Berber probably only had two oral labial consonants, which will be reconstructed here as *β and *f.³ The reconstruction of *f is

2. One of the anonymous referees points to the fact that all researchers that have worked on comparative Berber also have knowledge of at least some other Afroasiatic languages and reconstructions. No doubt, being informed about other branches influences the directions and decisions taken, consciously or unconsciously. While acknowledging this influence, I still think there is an important distinction between analyses based on data from Berber only (however biased the analysis may be) and those explicitly using other language families in their argumentation.

3. Standard IPA symbols will be used in the transcriptions, with a number of exceptions: š = IPA [ʃ]; y = IPA [j]; ž = IPA [ʒ]; ġ = IPA [dʒ]; č = IPA [tʃ]. Signs with a dot underneath designate pharyngealized consonants (e.g. ḍ = [dʰ]). Length is expressed by doubling the symbol. For Zenaga, the broad phonetic transcriptions by Catherine Taine-Cheikh have been maintained with vowels but adapted for consonants. The short (or central) vowels of Ghadames and Tuareg are marked by means of the *breve* sign. Of course, the phonetics of reconstructed consonants are difficult to establish, and, in spite of the use of IPA symbols, they should be taken as approximations.

entirely unproblematic: cognates with *f* in all word positions abound in modern Berber languages. All modern Berber languages have the same pronunciation, a voiceless labiodental fricative. The geminate counterpart of **f* is **ff* (for a large number of words including **f*, see Nait-Zerrad 2002).

The situation with the consonant represented here as **β* is different, and it has been the subject of one of the few longstanding debates in Berber historical phonology. While Beguinot (1924) and Kossmann (1999) propose a reconstruction as a bilabial consonant, Prasse (1969; 2011) and Acosta Armas (2017) prefer a reconstruction as a glottal fricative *h*.

**β* is pronounced as a labial fricative in a few Libyan varieties: Ghadames [β], Awjila [v]. In these varieties, it occurs in all positions of the word.

In the other varieties, **β* has different reflexes depending on its place in the word. When followed immediately by a consonant, the reflex of **β* is regularly *b*. Elsewhere, a weakened reflex is found, which, depending on the language and the context, is *h* (in Tuareg), *ww* ~ *gg^w* (intervocally in Tashelhiyt and Central Moroccan Berber) or the complete loss of the consonant (elsewhere) (see Kossmann 1999: 108-109 for details). In Zenaga, **β* is lost when not immediately followed by a consonant, but its previous presence is still clear from vowel lengthening (Kossmann 2001a). In pre-consonantal position, it has become *w*, cf. Zenaga Aorist *āwðər* ‘to mention’ as compared to Ouargla *əbder* ‘id.’ and Ghadames *ǎβðər* ‘id.’. There are, however, a number of unexplained cases where Zenaga has *b*, e.g. *oʔbih* ‘smoke’, comparable to forms in other languages that point to **β*, such as Ghadames *oβu* (for more cognates, see Kossmann 1999: 100).

While the complete loss of **β* is widespread when not immediately followed by a consonant, it has had different vocalization effects according to the dialect. This shows that the loss of **β* happened independently in these varieties.

The identification of pre-consonantal *b* in modern Berber with the other reflexes of **β* (such as Tuareg *h*) is based on a number of observations. One is of a structural type: The non-*b* reflexes of **β* seem to be in complementary distribution to *b*. Another structural argument is the fact that non-labial reflexes of **β* still trigger labial dissimilation of *m* into *n* in some prefixes (for details, see Kossmann 1999: 131). A further argument is of a comparative nature: in Ghadames and Awjila, the same reflex is found for both *b* and non-*b* reflexes elsewhere. Finally, language-internal paradigmatic variation between *b* and non-*b* reflexes of **β* show that they were originally one

single segment. There are abundant examples of pre-consonantal *b* varying with non-*b* reflexes in intervocalic position, e.g. the Aorist-Imperfective pair in Tashelhiyt Aorist *bzg*, Imperfective *azzg* (from *əβāzzāg) ‘to be wet’ (for a recent addition to our data concerning this variation, see Mourigh 2015: 152 on Ghomara).

An interesting detail in the history of *β is that it has assimilated to *f* in most varieties when immediately preceding a voiceless consonant. The assimilatory nature of these forms is also shown by variation between pre-consonantal *f* and non-*b* reflexes in intervocalic position, e.g. Tashelhiyt Aorist *fk* (< *āβkʷəʔ), Imperfective *akka* (< *əβākkʷāʔ) ‘to give’.

There is little, if any, evidence for a geminate counterpart to *β. In fact, in cases where one would morphologically expect to have geminated *β, this seems to have been prevented by means of metathesis. Thus modern instantiations of *β such as Mali Tuareg Aorist *ālh*, Imperfective *hall* ‘to weep’ (Heath 2006: 206) are most easily understood as coming from *ālβəʔ – *əβällāʔ, in which the Imperfective form has metathesized *β.

In Kossmann (1999), some evidence was provided that would point to a third bilabial consonant *b. This comes from a small number of instances of *b* (instead of β) in Ghadames, and from a small number of Berber words that have a reasonably wide distribution and *b* in intervocalic or word-final position. At present, I think that the evidence for this reconstruction is not sufficient for proposing a separate proto-phoneme. The few unexpected Ghadames forms may well be inter-dialectal borrowings (cf. Souag 2017), while at least some of the more wide-spread forms with *b* may in fact be *Wanderwörter*, i.e. words with a non-Berber origin that spread over the Berber-speaking territory in post-proto-Berber times. I assume this could be the case of the terms for faba bean (*abaw* and variants) and for the term for pigeon (*edāber*, *itbir*, *adbir*...).

The original pronunciation of *β is difficult to pin down. The fact that *β became *f* when followed by a voiceless consonant is good evidence that it was originally a voiced consonant, as otherwise the assimilation would make no sense. It is more difficult to decide whether it was a fricative or a stop in proto-Berber times. On the one hand, the evidence from Ghadames and Awjila suggests a fricative pronunciation, a reconstruction which would concur well with the large-scale weakening of the consonant in the other varieties. On the other hand, one could also envisage a reconstruction where the proto-Berber pronunciation was *[b], a pronunciation preserved in most languages when followed by a consonant. In this case, one would have to assume that all languages underwent further weakening, including

Ghadames, Awjila and Zenaga, which would have carried the weakening over to all positions of the word. Of course it would also be possible to take an intermediate position, assuming that *β had two allophones, *[b] and *[β] depending on its position in the word, and that in Ghadames, Awjila and Zenaga the continuant pronunciation spread to all positions.

While the correspondences in the Berber languages make both *[β] and *[b] (or a combination) plausible reconstructions, there is some evidence that rather points to a fricative realization. In the first place, the voice assimilation *β > *f* is more easily understood if *β was a fricative (assuming that *f* was a fricative at that time, see below). In the second place, the apparent impossibility of having geminated *ββ makes much more sense if the consonant were quite weak (like a fricative or an approximant) than if it had been a stop. As shown below, restrictions on gemination seem to have applied to a number of other consonants, too, viz. ? and possibly *h*, *w*, *y*.

3. Dental/Alveolar stops

The system of dental/alveolar stops consists of three elements, for which I will use the symbols *d, *t and *ḏ.

The reconstruction of *d is straightforward. If one abstracts away from occasional assimilations, the consonant is well preserved in all Berber languages as a voiced consonant. In languages which have undergone the large-scale weakening process called spirantization in Berber studies, it is an interdental fricative, while in the other languages it is a dental or alveolar stop. Its geminate counterpart is *dd* everywhere. For cognates including *d, see Nait-Zerrad (1999).

The situation with *ḏ is slightly more complicated. Like with *d, *ḏ seems to have been preserved in all contexts in all Berber languages. However, there exists a rather erratically distributed dialectal variation between *ḏ* and *ṭ* for this consonant (*ṭ* is found in Ghomara, Dadès, Ayt Warayn in Morocco; in eastern Kabylia in Algeria, in Jebel Nefusa and Awjila in Libya, and in Siwa in Egypt), which makes it hard to decide which pronunciation should be considered original. In languages with spirantization and a voiced reflex of *ḏ, *ḏ* is pronounced as a pharyngealized interdental fricative, while in those spirantizing varieties that have a voiceless reflex of *ḏ, *ṭ* is never spirantized. Its geminate counterpart is *ṭṭ* virtually everywhere; in a few languages where it is normally *ḏḏ* (e.g. Ghadames), this is an analogical regularization based on the non-geminated pronunciation, as shown by the existence of some exceptional forms with *ṭṭ*. An important exception to this is Zenaga, which has *ḏḏ* throughout (Taine-Cheikh 2001-2003: 20ff.). It is therefore uncertain if the

voiceless pronunciation $t̥$ of the geminate really goes back all the way to Proto-Berber.⁴

Depending on whether one has to do with a spirantizing or a non-spirantizing variety, the reflex of *t is either a voiceless interdental fricative (which in a few languages can be weakened further to *h* or even be lost, e.g. Chaouia) or a dental or alveolar stop (which can have assibilated realizations, e.g. Figuig). Its geminate counterpart is *tt* (which, depending on the variety, may be assibilated). In contrast to the other two consonants discussed in this paragraph, *t presents a number of intricate problems (see already Marcy 1936: 51).

In Berber, there exists an interesting variation between forms with and without *t*. There are two main well-attested and highly salient contexts where this is found.

In the first place, there exists variation between *t* and *e* in verbs ending in *t*. This is a very common situation in Tuareg, which has a word-building suffix *-āt* of unclear semantics (an “augment” in the terminology of Heath 2005), which becomes *e* when followed by a suffix, e.g. *i-ffurrāt* ‘he flew away’, *əffurre-y* ‘I flew away’ (Heath 2005: 295). The “augment” is also found in some residual forms in other Berber languages, but it does not have the same allomorphy there as found in Tuareg. In addition, there are a couple of short verbs ending in *t* that have similar variation between *t* and *e* or \emptyset , esp. **āmmət* ‘to die’ and **āwət* ‘to hit’. In Tuareg, as well as in a few other languages, one finds forms such as the following. (Perfective forms; examples from Prasse *et al.* 2003: 563 and Kossmann 1997: 144):

Table 1 — Paradigmatic variation between *t* and zero in the verb ‘to die’

	Tuareg (Ayer)	Figuig	
3SG:M	<i>y-əṣṣūt</i>	<i>i-mmut</i>	‘he died’
3PL:M	<i>āṣṣe-n</i>	<i>mma-n</i>	‘they died’

Elsewhere, the forms with final *t* are found all over the paradigm, probably representing paradigmatic leveling by analogy; one may note that in Zenaga the forms without *t* have been generalized (cf. Kossmann 2018). While one could assume that the “augment” has some intricate morphological history that would explain the presence of the variation in a non-phonological way, this would not work with the verb ‘to die’, as the widely attested nominal derivation **ta-māttan-t* ‘death’ shows that *t* is part of the stem.

In the second place, many Berber languages show variation between *t* and **e* in Direct Object pronouns (cf. Marcy 1936; Brugnatelli 1993; Kossmann 1997b). Thus, in Mali Tuareg one has two major

4. I owe this point to one of the anonymous referees.

allomorphs of the third person Direct Object clitics, one showing *t(ă)*, the other showing *e* (Heath 2005: 604-605), see Table 2.

Table 2 — Two series of Direct Object pronouns in Mali Tuareg

	I	II
3SG:M	<i>t(t)</i>	<i>e</i>
3SG:F	<i>tăt</i>	<i>et</i>

Similar forms are found all over Berber, and it seems reasonable to consider the variation a feature of Proto-Berber. It should be noted that Kossmann (1997b) proposes to reconstruct two entirely different sets of third person direct object clitics, which would not be related etymologically. In view of the wide-spread variation between *t* and *e* in the final-*t* verbs, I think a phonological explanation is to be preferred. It is, however, far from clear what the exact conditioning of the phonological change would have been.

One also wonders whether the frequent dropping of the verbal person prefix *t-* (2nd persons and 3SG:F) found in many Tuareg dialects is somehow related to the variations described above.

The fact that different cases of *t* – *e* variation were found, which do not seem to have any morphological connection, strongly suggest that they reflect a phonological process, presumably one where **t* was weakened under some specific conditions. Unfortunately, it is difficult to specify these phonetic conditions. The contexts where the *t* and *e* forms of the Direct Object clitics are used are different from language to language, and it is therefore difficult, if not impossible, to decide in which context the *t*-less forms were originally used. The only condition that is relatively clear is that concerning the *t*-final verbs, where word-final *t* is preserved, while intervocalic *t* is dropped.

It should be noted that positing a (somehow conditioned) loss of *t* in a very ancient stage of Berber would open up one more highly interesting etymological possibility (see Vycichl 1992: 259). It might be possible to analyze the nominal suffix of the feminine plural *-en* as being composed of the feminine suffix *t* followed by the plural suffix *-ăn* (Table 3).

Table 3 — A very tentative scenario for the development of the nominal plural suffixes

	old	new
m:sg	∅	∅
f:sg	<i>-t</i>	<i>-t</i>
m:pl	<i>-ăn</i>	<i>-ăn</i>
f:pl	<i>-t-ăn</i>	<i>-en</i>

All in all, the situation with **t* is complex as at present no clear conditioning for its variation with \emptyset and *e* has been defined. There is little reason to consider the sound change as post-dating Proto-Berber. If the (quite adventurous) idea that the nominal suffix F:PL *-en* goes back to **t-ǎn* is correct, one can safely assume that the sound change had already taken place by Proto-Berber times, as *-en* and its cognates are attested in all Berber languages without exception.

4. Sibilants

In modern Berber languages, there are two sets of sibilants: *z*, *s*, *ʒ* and *ž*, *š*. As shown in Kossmann (1999), there is very little evidence that would suggest that this division goes back to Proto-Berber times (see already Basset 1952: 6 for a similar observation). In fact, with the exception of some dissimilatory occurrences of *ž* (Kossmann 1999: 228), there are hardly any forms with non-geminate *ž* and *š* that have sufficient attestation to be reconstructed with confidence. The few cases of widespread *žž* and *šš* may go back to **zy* and **sy*, respectively (see Kossmann 1999: 229 for some details). As a result, we can only reconstruct one single set of sibilants, which will be represented here as **z*, **s*, **ʒ*.

The original pronunciation of these sibilants is difficult to establish. The large majority of Berber languages have alveolar pronunciations (“sifflantes” in French linguistics). However, in Awjila, Tetserrret and Zenaga different reflexes are found. As these languages all present interesting archaisms (as well as innovations) that set them apart from other Berber languages, this fact should be taken very seriously. In Awjila and Zenaga, there is quite some variation as to the reflexes of **s* and **z*. In Zenaga, two phonemes correspond to **z*: one which is mostly pronounced \bar{z} ⁵ (sometimes *ž*), and one which is mostly pronounced θ (sometimes *z*) (Taine-Cheikh 2001-2003: 23-28).⁶ As far as I can see, there is no congruence in the distribution of the variant reflexes in Zenaga, and Awjila, and, for the time being, I consider them as unexplained rather than considering them as evidence for the existence of two sets of Proto-Berber sibilants. Table 4 presents the most common reflexes of the sibilants in these two languages (cf. Taine-Cheikh 2001-2003; 2008: lxxiii; Lux 2013: 132-136; van Putten 2014a; 2014b).

5. \bar{z} stands for a non-strident pronunciation of *ž*.

6. Taine-Cheikh (2001-2003) considers θ/z the regular counterpart of geminate *zz*, and $\bar{z}\bar{z}$ the counterpart of *žž*. While this makes perfect sense in a synchronic framework, I do not see much evidence that *žž* corresponds to *žž* or *zz* elsewhere in Berber. Most examples of *žž* seem to reflect or contain attested or reconstructible *y(y)* in the other Berber languages.

Table 4 — Common reflexes of the sibilants

	Zenaga	Tetserret	Awjila
*s	š	š	š ~ s
*z	z̄/z̄ ~ θ/z	ž	ž ~ z
*z̄	θ/z̄ ⁷	ṣ	z̄
*ss	ss	ss	šš ~ ss
*zz	zz	zz	žž ~ zz
*z̄z̄	z̄z̄	ṣṣ	z̄z̄

In addition to this, one can mention the well-known development of *z in Tuareg, which became [z] ~ [ž] in Niger, [š] in Mali, and [h] in Algeria.

5. The velar series

One of the few new ideas in Kossmann (1999) was the proposal to distinguish two sets of velar stops, one set tentatively reconstructed as *k^v, *g^v, while the other set was reconstructed as *k, *g. The main argument behind this reconstruction is the presence of two distinct sets of cognates in the so-called Zenatic varieties. In these varieties, *k^v and *g^v would have become palatal sibilants (š and ž, respectively), while *k and *g are represented by velar stops (or developments thereof). In all other varieties, the two sets would have merged. In languages with spirantization, *k* has become ç or š, while *g* has become ĵ or y. As a result, in some Zenatic dialects with spirantization the reflexes of *k^v (> š) and of *k (> ç > š) have merged for non-geminates. In many other Zenatic dialects, the distinction is well maintained. The distinction proposed in Kossmann (1999) also pertains to geminate *kk^v (> čč > šš in Zenatic) / *kk (> kk) and *gg^v (> ĝĝ > žž in Zenatic) / *gg (> gg).

While there is little doubt about the existence of these two cognate sets, their interpretation as reflecting two different phonemic sets is not without caveats (cf. the discussion in Kossmann 1999: 169ff.). In the first place, the distribution of *k^v and *g^v as shown by the Zenatic correspondences is partly conditioned: Unsurprisingly, the palatalized set is found before *i*. Moreover, the palatalized series is not attested when followed by a consonant or by *u*.

One possible interpretation, suggested and rejected in Kossmann (1999), would be to assume that the palatalization in *k^v and *g^v was the effect of a following palatal vowel. This would concur with the two distributional restrictions. It would imply a reconstruction with three

7. Except for a few exceptional cases, *θ* and *z̄* are in complementary distribution (Taine-Cheikh 2001-2003: 30).

different short vowels, \tilde{a} , \tilde{i} , and \tilde{u} , which is possible, but not certain (see below). As mentioned in Kossmann (1999), such a reconstruction would work for many forms, but produces problems elsewhere. In the first place, there are a number of verbs which have the same stem structure, but different reflexes, for example Tashelhiyt *ag^wr* ‘to be more’, Zenatic *ažər ‘id.’ versus Tashelhiyt *ag^wl* ‘to hang’, Zenatic *agəl ‘id.’. One could venture to explain such forms by assuming different vocalization types in Proto-Berber (i.e. *agül vs. *agīr), but such an analysis is not unproblematic.

Such ways around are more difficult in the case of the opposition between *k(k)^y and *g(g)^y in the position between two plain vowels, the second of which is *a*. In such phonetic contexts, there is no obvious place for a conditioning factor. It should be noted, however, that some of the words with the palatalized series under this condition can be shown to contain an ancient laryngeal consonant on the basis of Zenaga data (Table 5).

Table 5 — Tentative alternative interpretations of words with *g^y, *k^y

1999 reconstruction		Zenaga	alternative interpretation
* <i>(a)g^ya</i>	‘bucket’	<i>ä?gäh</i>	* <i>a-ṭīga(h)</i>
* <i>(a)k^yal</i>	‘land’	<i>a?gäy</i>	* <i>a-ṭīkal</i>

Kossmann (1999) also tackles the challenging problems of variation between *y and *k^y. According to this study, a number of phonetic rules would have been at work in Proto-Berber that changed *k^y to *y under some circumstances: The most consequential condition is when *k^y is preceded by a plain vowel and followed by schwa. Of course, this can easily be converted into an analysis without a palatalized velar phoneme, as the schwa in question could be *ī, while the cases where Kossmann (1999) has *V_kə or *V_gə, the relevant short vowel would have been *ü. It is not entirely clear that the variation *y ~ *k^y was already present in Proto-Berber (cf. van Putten 2014a for counterevidence from Awjila).

All in all, it is not clear whether the reconstruction of two series of velars as proposed in Kossmann (1999) is absolutely necessary. In a large number of cases, an analysis where the palatalized velars are in fact phonetically conditioned by an adjacent *i or *ī seems to work out quite well (as long as one is willing to reconstruct *ī of course). It would, however, be necessary to go through all the evidence—especially in the light of the Zenaga data now available—in order to see whether this solution really works better than the one proposed in 1999.

6. The uvular consonant

Most Berber languages have a voiced uvular or back-velar fricative γ or y which corresponds to a geminate voiceless uvular stop qq . The corresponding proto-phoneme will be represented here as $*\gamma$. The main exceptions are Zenaga and Tetserret, where the normal cognate of γ is a glottal stop or zero, respectively. As shown in Taine-Cheikh (2004) and in Kossmann (2001b; 2012), Zenaga /ʔ/ presents a merger of two different phonemes, $*\gamma$ and $*ʔ$ (on the latter, see below); in the phonological system of Zenaga the reflexes of these consonants behave largely the same way (see below under /ʔ/ for details). Cases where Zenaga has γ are rare, and they sometimes seem to go back to ancient velar stops, and otherwise may be borrowings from other Berber languages (Souag 2017). In Tetserret, which lacks the glottal stop of Zenaga, $*\gamma$ has been lost entirely, although loans from Tuareg brought it back into the phonemic system (Lux 2013: 127ff.). Finally, in Awjila, $*\gamma$ has the reflex [q] in the vicinity of a pharyngealized consonant /t/ or /z/ (van Putten 2014b).

The geminate form of $*\gamma$ is qq everywhere except in Tetserret. In Zenaga, there is evidence for a form qq corresponding to qq elsewhere in forms such as *aqqiγ* ‘to look’ (cf. for example Beni Iznasen *qqal* ‘to look’; Taine-Cheikh 2001-2003: 34). In a number of varieties, the relationship between γ and qq is no longer used paradigmatically (single γ corresponding to geminate $\gamma\gamma$, as in Awjila and Ghadames), but, like in Zenaga, there is ample evidence from irregular and non-derived forms that these varieties originally also had qq .

Generally speaking, the reflexes of $*\gamma$ are fairly consistent within Berber. There are, however, a couple of problems that indicate that the situation may originally have been more complex than it looks now.

In the first place, there are about ten lexemes in which one finds dialectal and/or paradigmatic variation between $*\gamma$ and $*g\gamma$. In most of these lexemes, $*\gamma/*g\gamma$ stands in the vicinity of /r/ (5 out of 10) or /z/ (2 out of 10); among the three other cases, only one ($*e\text{-}s\ddot{a}m\ddot{a}\gamma/g\gamma$ ‘slave’) can be considered convincing (for details, see Kossmann 1999: 212-216). There does not seem to be a major dialectal conditioning to having forms with $*\gamma$ or forms with $*g\gamma$; every word form has its own dialectal distribution, and in a number of cases forms with $*\gamma$ and with $*g\gamma$ are found in one single variety, e.g. Tashelhiyt *ry* ‘to burn’, *tirg-in* ‘embers’. In the second place, there are a number of nouns where $*\gamma$ corresponds to \check{s} in Ghadames and to z in Tuareg (Vycichl 1990; Kossmann 1999: 216-218). There may be some correlation with the presence of /i/ in these words, and one remarks that three out of five items have /r/ as a root consonant. No convincing explanation for these two phenomena has been put forward yet.

A further element in the analysis of *ɣ is its relationship to the voiceless uvular (or back-velar) fricative, i.e. *x*. Kossmann (1999: 236ff.) attributes wide-spread cases of *x* in modern Berber to two sources: voice assimilations to a following voiceless consonant, and final devoicing. The latter process mainly affects grammatical elements. This may be due to the fact that lexical stems tend to have paradigmatic variation between forms where *ɣ would be in final position and forms where it would be followed by a suffix or a clitic; *y* may therefore have been analogically reintroduced in lexical items. According to this analysis, the Zenaga correspondent of *x* would be *k* rather than a glottal stop. While the idea of devoicing of *ɣ in non-Mauritanian Berber has remained unchallenged in the scholarly community, the rule *[*x*] > *k* in Zenaga was rejected by the main specialist in this language, Catherine Taine-Cheikh (2004; 2005). The discussion was continued in Kossmann (2006), which points to the existence of paradigmatic variation between ? and *k* in Zenaga.

The original pronunciation of *ɣ is difficult to establish. A sound change *ɣ > ? is unexpected and, more importantly, the plosive realization of the geminate is suggestive of an ancient plosive realization in the non-geminated consonant. Inspired by the geminate form and by Arabic dialects where *q has become [ʔ], a reconstruction *[q] would make perfect sense. This reconstruction is problematic once one accepts the idea that in Zenaga *ɣ became [ʔ], while a devoiced variant of *ɣ became [k], as the consonant would have been voiceless from the outset. One way of solving this problem is to posit an original pronunciation as a voiced uvular plosive rather than a voiceless one, i.e. *[g], a reconstruction which I think is phonetically as plausible as *[q].

7. The glottal series

Already in 1969, Karl-G. Prasse proposed a reconstruction of Berber involving a glottal series. In his 1969 study of historical Ahaggar Tuareg phonology, he distinguished several different elements *h*. His *h*² and *h*³ correspond to the non-pre-consonantal cases of *β in our analysis.⁸ His *h*¹, on the other hand, is an element reconstructed entirely on the basis of an internal reconstruction of Tuareg morphology, and especially on the idea that the major morphological verb type should be analyzed as consisting of triconsonantal roots (see for the advanced analysis of this internal reconstruction Prasse 1972-1974). This latter argument is in itself questionable—why should

8. *h*² stands for those *h* that are attested in Ahaggar Tuareg and do not go back to *z; *h*³ stands for those *h* that are not present in Ahaggar Tuareg, but appear in corresponding words in Ghadames and/or Mali Tuareg (Prasse 1969: 5).

one assume that Proto-Berber (or its ancestor) did not have more diverse verbal root shapes?—but of course not necessarily wrong. Kossmann (1999) did not discuss glottal consonants, as his reconstructions did not aim to pass the threshold of Proto-Berber (defined as the starting point of differentiation), while, at that time, Prasse's analyses seemed to go far beyond that point in time.

7.1 The glottal series: *ʔ

Our new data on Zenaga have dramatically changed the picture concerning the glottal series. The studies by Catherine Taine-Cheikh clearly show that Zenaga preserves at least one ancient glottal consonant, /ʔ/. This consonant has a specific distribution: in word-final position it is not realized (though different from underlying final vowels, see 6.2); and in non-final position it can only appear in coda position, preceding a consonant. Zenaga /ʔ/ has two etymological backgrounds. In the first place, it is the regular correspondent to *ɣ. In the second place, it occurs in a large number of words which have no corresponding consonant elsewhere in Berber. This situation brought Taine-Cheikh (2004) and Kossmann (2001b) to the conclusion that the Zenaga glottal stop should be reconstructed into Proto-Berber. The most important argument comes from verbs with a final glottal stop in Zenaga. It can be shown that these verbs correspond to verbs belonging to a specific type of biconsonantal roots in other Berber languages, that have different morphology from other biconsonantal verbs (Destaing 1920; Kossmann 1994). In addition, it was shown that in Ghadames cognates of verbs with an initial glottal stop in Zenaga have a specific morphological shape not found in other verbs (Kossmann 2001b). As a result, there can be no doubt that the Zenaga glottal stop is the reflex of an ancient Berber consonant—symbolized here as *ʔ. The fact that different non-Mauritanian languages have different vocalic reflexes of *ʔ (see Kossmann 2001b and van Putten 2015 for some details) corroborates the idea that the consonant was part of the Proto-Berber system and was lost independently everywhere except in Zenaga.

While the presence of *ʔ may be considered well-established now (see also Prasse 2011), its reflexes in non-Mauritanian Berber present numerous problems, some of which were solved by van Putten (2015), while others still stand out. Moreover, while no doubt the large majority of glottal stops in Zenaga go back to *ʔ and *ɣ, one cannot rule out that some of them have a different background. There exists a large amount of lexical and paradigmatic variation between forms with and without glottal stop in Zenaga (cf. for example Taine-Cheikh 2006 for plural formations), and as long as these variations are not

well understood historically, one should not too easily equal any Zenaga /ʔ/ (if not < *ɣ) with *ʔ.

On the other hand, the absence of a glottal stop in Zenaga in a certain word cannot automatically be taken as proof of its absence in Proto-Berber (or its predecessor). Thus one remarks that Zenaga data (and reflexes elsewhere) show that there are many reconstructible triconsonantal verbs of the types *ʔCC and *CCʔ. There is, however, not a single verb that can be reconstructed as *CʔC on the basis of Zenaga. This opens the way for an analysis where some biconsonantal verbs (i.e. those with the structure vCvC in Zenaga) in fact go back to *CʔC verbs, a possibility already envisaged by Prasse (1972-1974). This would imply that *ʔ was lost under some conditions in Zenaga.

There is no indication that *ʔ could be geminated.

The original pronunciation of *ʔ is difficult to establish. Of course, as Zenaga is the only variety that preserves the consonant, a reconstruction as *[ʔ] is logical. On the other hand, there is little reason to assume that Zenaga is particularly archaic in its phonetics, and evidence from one single language is hardly persuasive.

Souag (2011) points to an intriguing fact with *ʔ. Not only is there no indication for a geminate counterpart to *ʔ, verb morphology suggests that the presence of *ʔ prevented a following consonant from geminating. Thus in the Imperfective of triconsonantal verbs, normally the second consonant is geminated, e.g. Aorist *āfrās ‘to divide’, Imperfective *āfārrās. In *ʔ-initial verbs, however, this gemination does not take place, and instead a prefix is used—a device otherwise used with longer verbs and with plain-vowel-initial and geminate-initial verbs. Thus one has the verb Aorist *āʔkār ‘to steal’, Imperfective *ātt-āʔkār instead of **āʔākkār. This is the situation in all Berber languages, including Zenaga. It shows that *ʔ was different from normal consonants, and that maybe the present distribution of /ʔ/ in Zenaga—word-internally only in pre-consonantal position—is much older than one might have expected.

7.2 The glottal series: *hʔ

In an overview article that Prasse wrote after the relevance of Zenaga became clear (Prasse 2011), he proposed the existence of two different glottal elements (in addition to the *h* that I reconstruct as *β here), which one could symbolize as *ʔ and *h. The second element would cover the cases of his *h¹ that cannot be explained by the Zenaga glottal stop. This would explain different pairs of verbs such as found in Ghadames (Table 6).

Table 6 — Reconstructions of Ghadames verb types following Prasse (2011)

	‘to dress’	‘to sneeze’	reconstruction
Aorist 3SG:M	<i>y-ǎls</i>	<i>i-nzu</i>	*y-ǎlsəʔ – *y-ǎnzəh
Perfective 3SG:M	<i>i-lso</i>	<i>i-nza</i>	*y-ǎlsǎʔ – *y-ǎnzǎh
	‘to rub’	‘to hang’	reconstruction
Aorist 3SG:M	<i>y-oməs</i>	<i>y-agəl</i>	*y-ǎʔməs – *y-ǎhgəl
Perfective 3SG:M	<i>y-omǎs</i>	<i>y-ugǎl</i>	*y-ǎʔmǎs – *y-ǎhgǎl

The idea that there could be a second ancient glottal consonant around has also been advocated by Taine-Cheikh (2004: 186-187) on the basis of Zenaga verbs ending in *h*. Kossmann (2001b), on the other hand, analyzes word-final *h* in Zenaga as a phonetic off-glide, due to the presence of a word-final vowel. While I think this makes sense on a synchronic level, it is of course very well possible that, diachronically, word-final *h* in Zenaga perpetuates an old consonant that used to have a broader distribution. One should emphasize, however, that there is no opposition between (non-glottal-stop) *Vh#* and (non-glottal-stop) *V#*, so extending the Zenaga distribution to Proto-Berber would mean that there were no vowel-final forms originally (of course one cannot rule out the possibility that in Zenaga word-final *h* has several origins, Taine-Cheikh 2004, Prasse 2011).

There is no major dialectal variation in the reflexes of this putative **h* (although large-scale analogical reformations make them sometimes difficult to establish, cf. Kossmann 1994), and it seems that its loss had already taken place in proto-Berber times. This means that the only reason to reconstruct this consonant is morphological simplicity: by positing **h* in addition to **ʔ*, one can explain most (if not all) biconsonantal verb roots as originally triconsonantal; otherwise, one would have to posit root types including a long vowel position. While this is an alluring take on the matter, it should be emphasized that it is hardly necessary that proto-Berber (or earlier stages) only had consonantal root elements.

8. Semivowels

The consonant *w* is a labiovelar approximant. Its geminate counterpart is *gg^w* in most languages. The consonant *y* is a palatal approximant. The question of its geminate counterpart will be studied below.

Many Berber languages have a large-scale merger of **w* / **y* with the plain vowels **u* / **i*, to the extent that it has been claimed for Tashelhiyt that semivowels and high vowels are positional variants of one single set of segments. The Tashelhiyt situation is extreme, but in many varieties **w* and **y* are quite labile and prone to changes. To

this date, no comprehensive analysis of the semivowels from a historical-comparative perspective has been undertaken, and the following remarks are to be taken as general impressions rather than well-established analyses. I will leave regular dialectal vocalizations of *w / *y out of the discussion and concentrate on the more problematic points.

8.1 The semivowel *w

The main context where *w is largely preserved in all languages is the intervocalic position with at least one plain vowel present. Thus, the verb ‘to help’ has the following reflexes of what must have been Aorist *awəs: Tashelhiyt *aws* ‘to help’, Ghadames *awəs* ‘id.’, Zenaga *āwuš* ‘id.’ (cf. Taine-Cheikh 2008: 556).

In word-initial position, its fate is more volatile. Even in languages that do not regularly have vocalization of *wə* to *u*, one sometimes finds forms with initial *u* instead of *wə*, e.g. Figuig *ul* ‘negation’ < *wār or *wār as opposed to *wətna* ‘sister’ (< *wālātma). In addition, there is an unexplained variation between generally attested *u*-initial nouns and much rarer forms with *w*, such as Mali Tuareg *ulh*, general Berber *ul* ‘heart’ as opposed to Niger Tuareg *əwəl* and the pan-Berber word *ulli* ‘small cattle’ as opposed to Ghadames *wālli* (maybe rather *wəlli*) ‘goat’. One may also compare forms such as Tashelhiyt *ury* ‘gold’ with adjectives like *a-wray* ‘yellow’ in the same language.

In word-final position, *w* is not very frequent. It is found in a relatively small number of triconsonantal verbs, the most widespread being *arəw (Aorist form) ‘to give birth’. In longer words, final *w may have been elided in final position after a plain vowel, as witnessed by widely attested forms such as Tashelhiyt *a-zgza* ‘blue (M)’, *ta-zgzaw-t* (F).

The consonant *w* is regularly found as the second consonant in a triconsonantal verb root, e.g. *āswə? ‘to drink’; *ānwə? ‘to be cooked’; *ārəwəs ‘to resemble’ (cf. also *əzəwu ‘to traverse’). In Zenaga and Tetserrret, *w has become *b* in a number of these verbs (Lux 2013: 141). The large majority (if not all) of these forms have a dental or alveolar consonant before *w.

In a reconstructible preconsonantal position, *w is extremely rare. It has long been understood that this is due to a process in which preconsonantal *w underwent full assimilation to a following consonant (cf. Prasse 1972: III/69 for a full analysis). Thus a form like *āwfəy ‘to go out’ would have become *āffəy*; traces of the ancient initial root consonant can be found in forms like the causative *ssufəy* (possibly < *ss-əwəfəy, van Putten p.c.) and in various verbal noun formations. While it is plausible that the large majority of geminate-initial verbs go back to forms with initial *w, this does not mean that

this is always the case. In the first place, there are indications that geminate-initial verb stems may also go back to forms with *w as their second consonant. The best evidence for this is found in forms such as Kabyle *əqqən* ‘to tie’ and its instrumental noun *asəɣwən* ‘rope’, which point to *äɣwən.⁹ In the second place, initial gemination is a word-building process in Berber, present in a fair number of verb classes (cf. Basset 1955). In some cases, this may provide a better explanation than the phonetic one. Thus, in a number of varieties, there are verbs with similar semantics that are differentiated by the presence or absence of initial gemination, e.g. Beni Iznasen *ərz* ‘to break’ vs. *rrəz* ‘to be broken’ and *ɣrəs* ‘to cut the throat, to slaughter’ vs. *qqərs* ‘to rip’ (notes by the author). In such cases, it seems preferable to consider this an ancient difference in ablaut pattern, e.g. *ärzə? vs. *ərräzä? and *äɣrəs vs. *əqqäräs.

A special problem is posed by verbs with initial *gg^w*, like *äggwəd ‘to jump, to fear’. *gg^w* is the geminate counterpart of *w* (cf. nominal forms such as Figuig *t-iwdi* ‘fear’), which would lead to a reconstruction *äwwəd, which, then, would be the only remaining geminate-initial verb in the language. I have no solution to this question.

It should be emphasized that the reconstruction of initial *w in these verb forms is based entirely on internal evidence. The proposed assimilation has taken place in all Berber languages in the same way, and therefore there are good reasons to assume that it had already taken place when Berber started to differentiate.

As mentioned above, the most common pronunciation of the geminate variant of *w is *gg^w*. In a number of languages labialization was lost, and *gg^w* merged with *gg* (e.g. Tuareg, Ghadames). In some other languages the pronunciation of geminate *w is *bb^w*, *bb* or *ḥḥ*. The best-known cases are (parts of) Kabyle, Zenaga and Tetserret. In the case of Kabyle, it makes sense to consider *bb^w* a later phonetic development of earlier *gg^w*, as this is well-attested in Kabyle dialects more to the east. There is no reason to posit an intermediate stage *gg^w* for Tetserret *bb* and Zenaga *ḥḥ/bb*. In Awjila, there is no trace of a plosive realization of geminate *w. This includes at least one word that does not have paradigmatic variation with non-geminate *w* in any Berber language, *ašəw(w)āša* ‘this year’. As remarked by van Putten (p.c.) this strongly suggests that the situation in Awjila is old, as there would be no basis for an analogical substitution of earlier *gg^w* by *ww*. It may therefore be wise to reconstruct the Awjila situation of *w* vs. *ww* to the Proto-Berber stage and consider the plosive geminates to be post-Proto-Berber developments.

9. Note that this solution only works if we assume that earlier forms of *asəɣwən* had a vowel between *y* and *w* (*a-səɣəwən or something similar).

8.2 The semivowel *y

The situation with the semivowel *y* is even more intricate than with **w*. In word-initial position, *y* is well-attested in the 3SG:M verbal prefix *y-* and in some pronominal forms. Like with **w*, vocalized variants are common and not always predictable.

It is not easy to establish the geminate counterpart to **y*. In the large majority of Berber languages, there are no forms with morphological alternations which allow us to establish what geminate would correspond to **y*. Most languages do have *yy*, which may develop into *gg* (esp. in Kabyle and Chaouia), but these forms mostly seem to be new, being either loans from Arabic or otherwise innovative. There are, however, a few indications that **y* originally corresponded to **ğğ* ([ɟː]) (Kossmann 1999: 232ff.).

There exists important dialectal variation between *y* and *k* when it is the last root consonant of a triconsonantal verb. While most languages have *-y* and only rarely *-k*, the inverse is true in Ghadames, Awjila and Zenaga. Most cognates of *-y#* verbs elsewhere have *-k* (> *g* in Zenaga) in these languages, e.g. Mali Tuareg *əzməy* vs. Ghadames *āzmək*; Awjila *zmək*; Zenaga *ažmug* ‘to sew’.

On the other hand, the number of verbs which have *-y* in Ghadames, Awjila and Zenaga is much smaller, although certainly not a marginal number. In Zenaga, there are also cases where the final *-y* of other varieties corresponds to the absence of a consonant, which is mostly—but not exclusively—the case when the verb also contains a velar consonant or *w* (Kossmann 2018). In Ghadames and Awjila, no conditioning factors have been found for the distribution of *k* and *y* in these verbs.

The background to this dialectal distribution is unknown. One possibility is that (part of?) the final *-y#* verbs in fact go back to **k* or **kʷ*, and that the situation in Ghadames, Awjila and Zenaga is original. If one assumes this, it is an open question whether there is any evidence for **-y#* as opposed to **-k#*. While all three languages with *-k#* also have *-y#* or *-∅* forms, the lexical distribution of these forms is different, and some forms with final *g* (< **k*) in Zenaga correspond to forms without a velar in Ghadames or Awjila and vice versa, cf. Figuig *rwəy*; Zenaga *ärwih*;¹⁰ Ghadames *ärwək* ‘to stir, to mix’; Figuig *mḍəy*; Zenaga *anḍug*; Awjila *ənṭi* ‘to taste’.

Word-final *y* is normally lost in longer forms when following *a*, as shown by forms like Tashelhiyt *a-yrda* ‘rat’, *ta-yrday-t* ‘mouse’.

There is little evidence for *y* in pre-consonantal position. As far as I know, no clear case of a *y*-initial triconsonantal verb exists, while

10. The final *h* in Zenaga *ärwih* is an automatic effect of the vowel being in word-final position, see section 7.2.

the evidence in nouns is relatively scarce. Kossmann (1999: 200-202) presents ten reconstructible forms that may contain pre-consonantal *y*, but in most cases it is impossible to decide whether *y* was really pre-consonantal, or rather intervocalic, as they are mainly attested in varieties where short vowels are elided in open syllables. It is therefore very well possible that pre-consonantal **y* underwent similar assimilations as pre-consonantal **w*. However, in contrast to **w*, there is no internal evidence that would corroborate this.

In post-consonantal position, the evidence for **y* is also quite meagre, although a full analysis is still lacking. The best evidence seems to come from a number of assimilations. As shown in Kossmann (1999: 223ff. and 229ff.), it makes sense to analyze some well-attested cases of *šš* and *žž* as assimilated forms of **sy* and **zy*. While the evidence for *šš* < **sy* is mainly circumstantial, the evidence for *žž* < **zy* is relatively strong. In Ghadames and Awjila, *žž* corresponds to *zi*, which may very well go back to **zyə*, e.g. Tashelhiyt *žži* ‘to be healed’, Ghadames *əzik* ‘to be healed’, apparently from **āzyəy/k*. Similarly, Ahaggar Tuareg *əhyəḍ* (< **āzyəḍ*) ‘to have scabies’ corresponds to Iwellemmeden Tuareg, Tarifiyt *əžžəḍ* ‘id’. Moreover, the following Zenaga verbs confirm that *žž*-initial verbs are different from other verbs with an initial geminate. Normally, such verbs take the prefix *ətt-* in the Imperfective. In *žž*-initial verbs, one also finds forms with medial gemination (Taine-Cheikh 2001-2003: 57; 2008: 629) (Table 7).

Table 7 — Zenaga verbs with paradigmatic variation of *žž* and *žVdd^y*

	‘to have scabies’	‘to be healed’
Aorist	<i>əžžuḍ</i>	<i>əžžig</i>
Imperfective	<i>izädd^yaḍ</i>	<i>əžžädd^yäg</i>

Assuming that *ğğ* (> *dd^y* in Zenaga) represents the regular geminated form of **y*, these forms would attest to *y* as a medial consonant: **āzyəḍ* / **əzāyyaḍ* and **āzyəy* / **əzāyyäy*.

The history of the very rare pan-Berber consonant *čč* (mainly found in the verb ‘to eat’) is difficult to point down. Kossmann (2008) proposes that it represents **ty* and reconstructs the relevant verb as **ātyə?* ‘to eat’. While the argumentation behind this reconstruction is largely circumstantial, it is plausible in the light of the other palatalizations due to a following **y*. Maybe assimilated **y* is also behind otherwise unexplained variations such as Tashelhiyt *kšm* vs. Siwa *kim* ‘to enter’ (< **ākyəm?*).

Kossmann’s study of three Berber verbs **āswə?* ‘to drink’, **ātyə?* ‘to eat’ and **ānwə?* ‘to cook’ (Kossmann 2008) proposes that a number

of irregular morphological features can be understood if one assumes that *w and *y could not be geminated at a certain moment in the prehistory of Berber. If this is correct, the constraint must have applied only at some very early stage, as all comparative evidence points to the possibility of gemination of *w and *y.

9. Other sonorants

In addition to the consonants analyzed above, Proto-Berber had four more sonorants: *m, *n, *l, *r. Except for some assimilations and dissimilations, *m and *n are preserved as such in all Berber languages. The fate of *l and *r is more complicated on the dialectal level, but their reconstruction is unproblematic. There exists no doubt that these four consonants can be reconstructed as such into Proto-Berber.

10. Remarks on pharyngealization and on consonant weakening

There are two points of discussion that surpass the level of individual consonants and that will therefore be treated in a section of their own. The first one is pharyngealization, the second one is the question of consonant weakening in Proto-Berber times.

As shown above, two consonants have pharyngealized pronunciations in all modern Berber languages: *ḍ and *ẓ. The most widespread pronunciation is voiced, but there are important dialectal differences at this point. Thus, the pronunciation [t] instead of [ḍ] is found in a large number of eastern dialects, and, sporadically, in Algeria and in Morocco. In Tuareg and in Zenaga/Tetserret, *ḍ is always voiced. The geminate counterpart, on the other hand, is consistently voiceless all over Berber, except in Zenaga. Voiceless pronunciations of *ẓ are only found in Zenaga and Tetserret (see section 4). In all other Berber languages, it is voiced, both as a non-geminate and as a geminate. It is therefore impossible to make a decision on the original voicing of *ḍ and *ẓ on the basis of the comparative evidence.

The uvular fricative (maybe originally a stop, see above) *ɣ is isolated within the Berber consonantal system, while the velar series lacks a pharyngealized counterpart. It thus makes sense, on a rather abstract level, to consider *ɣ (whatever its original pronunciation) as the pharyngealized counterpart to the velar consonants.

On the basis of Afroasiatic evidence, one may assume that at some stage in the linguistic history of Berber the pharyngealized consonants and *ɣ were glottalized (ejective or implosive) rather than pharyngealized. There is, however, no hard evidence for a glottalized pronunciation coming forth from internal evidence in Berber, and the change from glottalized to pharyngealized was probably already in place at the Proto-Berber stage.

The second question concerns weakening in the Proto-Berber consonant system. As shown above, in a number of articulation places all consonants are most easily reconstructed as fricatives rather than as plosives. This is the case of *β, *f and, to a lesser degree *ɣ. Among these, *β has no geminate counterpart, the geminate counterpart of *ɣ is always a plosive, while the geminated counterpart of *f is always a fricative.

As the Proto-Berber system seems to have stops in the alveolar and velar series, it would not be unexpected to have stops at the other articulation places, too. Comparative evidence with *ɣ indeed suggests that it was still a stop in Proto-Berber (see above), possibly *[g]. While I think that a consistently fricative pronunciation of *β is the simplest way to explain the present situation, a reconstruction *b or one with allophonic variation between *[b] and *[β] is also viable. For *f, Berber-internal reconstructions do not provide any evidence for an ancient plosive realization.

One way to explain this situation is by assuming that in a not-too-far-away stage preceding Proto-Berber, all these consonants were plosives. They would have been subjected to a general process of lenition, which first targeted *[p] and, maybe somewhat later, *[b]. When Proto-Berber broke up, the tendency towards lenition did not stall, and in a similar fashion *[g] was targeted everywhere, except in Zenaga/Tetserret, and restricted to the non-geminate consonant. Of course, such an explanation is conjectural, and predicated upon the assumption that the original pronunciation must have been a plosive.

In addition to these lenitions, which would have taken place just before or just after the break-up of Proto-Berber, there are also lenition processes that still apply in modern Berber languages. These processes are known as “spirantization” in the tradition of Berber linguistics and involve the lenition and fronting of bilabial, alveolar and velar stops. Spirantization does not affect geminates, and is therefore quite different from the lenition that would have changed *[p] to *f*, but similar to that that would have changed *[g] to *ɣ*.

From the point of view of dialectal distribution, spirantization appears mainly in the northern part of Morocco, Algeria, and Tunisia, following a line that cuts across all other linguistic boundaries. It therefore looks very much like an innovation that spread at a moment when older splits were being smoothed out by convergence (Kossmann 1999: 21). There are, however, two caveats to this. In the first place, lenition targeting non-geminate alveolar stops is also found in Zenaga (cf. Taine-Cheikh 2001-2003 for details) and in Tetserret (Lux 2013). If one assumes that this process is historically related to the northern “spirantization” it would push back the lenition deep in time, as Zenaga and Tetserret are neither geographi-

cally, nor linguistically, anywhere close to the spirantizing dialects of the north. Of course, this assumption is by no means necessary, lenitions being common in the history of languages, and Zenaga involving many other types of lenition (e.g. voicing of *k and *l > y). The second caveat lies in the phonetic conditioning of northern Berber spirantization. In most of these languages, very similar conditions are found, basically lenition everywhere except in some consonant clusters. However, at the geographical extremes of the spirantization-affected region, much more restricted lenition is found, which only targets syllabic codas. This is found both in north-western Morocco (Ghomara, Mourigh 2017) and in Tunisia. Vycichl (1975) proposes that this is the ancient state of affairs and suggests that the other spirantizing dialects generalized the lenition, while the non-spirantizing dialects underwent a process of strengthening. As far as I know, this proposal—which had the sympathy of Lionel Galand—has never been exploited further (see Acosta Armas 2017 for an argumentation that spirantization played a role in Guanche).

11. Vowels

There exists no doubt that Proto-Berber had two types of vowels, which will be called “short vowels” and “plain vowels” here. Alternative terms would be “central vowels” vs. “peripheral vowels” (cf. Louali 1992; Louali-Raynal 2000) and “long vowels” or “full vowels” instead of “plain vowels”.

Only Ghadames and Tuareg maintain a clear contrast between these two series. In most other languages, the short vowels have collapsed into one single element, schwa. While schwa remains fully phonemic in a number of varieties (mainly in Libya and Siwa), it is hardly phonemic (when at all) in the Berber languages of Algeria and Morocco.

In Zenaga, a different process has eliminated the length distinction, and short and plain vowels have collapsed into a small system of high and low vowels (see below). The vowel system of Tetserrret is very different from all other Berber languages and would need an extensive analysis in order to be understood historically.

11.1 The short vowel system

Tuareg and Ghadames unambiguously show the existence of a binary contrast among the short vowels between a higher and a lower vowel, symbolized here by *ə* and *ǎ*. While in Zenaga the short vowels have merged with the plain vowels, the height contrast is maintained.

The main question concerning the short vowel system is whether one should reconstruct one or two high vowels. Prasse (1972-1974)

opts for two short high vowels *ī and *ū, even though only one short high vowel is attested in Tuareg, the language on which his analysis is based. Kossmann (1999) reconstructs a system with two high vowels on the basis of a synchronic and comparative analysis of labialization in a number of Moroccan and Algerian varieties. This analysis clearly shows that velars and uvulars can only be labialized if they occur in the vicinity of a reconstructed short high vowel; in the vicinity of *ā, non-labialized forms are found. It is much less clear that labialization would provide evidence for a contrast between two different high vowels, as no clear partition between labialized and non-labialized consonants in the vicinity of ancient short high vowels can be discerned. An analysis according to which a single short high vowel phoneme would automatically be rounded in the vicinity of velars and uvulars (similar to modern Zenaga) would probably work for a large part of the evidence. Therefore I think, different from twenty years ago, that, while labialization is indeed related to the presence of an original high vowel, it is not necessarily indicative for a phonemic contrast between *ū and *ī.

Another potential piece of evidence for a contrast between *ū and *ī may come from Zenaga. As mentioned above, in this language the short and the plain systems have collapsed, maintaining a difference between low and high vowels. There is an enormous amount of allophonic variation, some of which is marginally phonemic (see Taine-Cheikh 2008: lxxiv for details). Most of the phonetic variants, however, can be understood on the basis of a two-vowel system with allophones conditioned by the surrounding consonants (cf. also Cohen & Taine-Cheikh 2000). In earlier works this led the present author to use “phonological” forms that glossed over the phonetic detail of Taine-Cheikh’s phonetic transcriptions. This was an unlucky choice, and it led to a blind eye to at least one potentially important phenomenon: the existence of unconditioned forms with *u* (which was already clear from Taine-Cheikh 1999: 301). While [u] is the regular pronunciation of high vowels in certain phonetic contexts, such as pharyngealized consonants and velars, it also appears in a number of forms where unrounded allophones would have been expected, and is therefore undoubtedly phonemic. One of the possible implications of this oversight was that ancient contrasts among short high vowels may have been missed. In order to check this, I performed a preliminary survey of forms with unconditioned *u* in Zenaga, which yielded about 40 unambiguous cases. The results are highly interesting, although no evidence for *ū vs. *ī was found. It seems that unconditioned *u* is mainly found in two historical contexts. In the first place, it is found in the vicinity of ? when the latter goes

back to non-final *y. It is normally not found in the vicinity of ʔ going back to *ʔ. Examples are *uʔran* ‘feet (of animal)’ < *i-yir-an; *yuʔra* ‘he aborted’, cf. Kabyle *əyri* ‘to have a miscarriage’; and *yuʔräs* ‘he slaughtered’ < *y-əyṛäs. The second group of nouns with unexpected *u* seem to perpetuate the Proto-Berber plain vowel *u, e.g. *uði* ‘melted butter’ (Tashelhiyt *uði*), *uri* ‘gold’ (Tashelhiyt *ury*), *uzzäy* ‘iron’ (cf. Tashelhiyt *uzzal*). There are also forms that have no cognates elsewhere, and forms that show other complications, but there is no indication that Zenaga unconditioned *u* could tell us anything about an ancient contrast between *ũ and *ĩ.

Thus, neither the presence of labialized consonants in northern Berber, nor the presence of unconditioned *u* in Zenaga provide us with evidence that Proto-Berber had more than a contrast between *ə and *ä. This does of course not rule out that such a contrast did exist in reality, and we already saw that assuming such a contrast might solve the problem of the two velar series proposed in Kossmann (1999). For the time being, I prefer to remain agnostic about this question.

11.2 The plain vowel system

Most elements of the plain vowel system are unproblematic. There exists no doubt as to the presence of *a, *i and *u in Proto-Berber. As shown by van Putten (2015), some irregularities in vowel correspondences are in fact due to the vicissitudes in the reflexes of short vowels in combination with *ʔ, and therefore do not affect the basic system.

Ghadames and Tuareg have two additional vowels, *o* and *e*. As shown in Prasse (1990) for Tuareg and in Kossmann (2001b) and van Putten (2015) for Ghadames, *o* can be understood either as a product of vowel harmony (Tuareg), or as a reflex of *äʔ (Ghadames). There is no reason to posit *o in Proto-Berber.

On the other hand, over the last few years, an important discussion has been undertaken by van Putten (2016) and Souag & van Putten (2016) about the history of *e* (see also Prasse 1990). This discussion is not only informed by the Tuareg and Ghadames forms, but also by additional data on Siwa, which has preserved *e* in a number of contexts. Moreover, while the normal cognate of Tuareg/Ghadames *e* is *i* in the other varieties, it seems to be *a* in Ghomara and in some Kabyle varieties (van Putten, p.c., referring to ongoing work together with Lameen Souag and Massinissa Garaoun).

Van Putten, expanding on a lead by Prasse, has shown that many cases of *e* (and its correspondents elsewhere) can be understood as the effect of assimilatory and dissimilatory processes, esp. a raising of

*a to *e when the next syllable has *ã (the rules are more complicated, see van Putten 2016; van Putten 2018). However, as the author admits himself, there are a number of elements that defy an interpretation like this, most importantly the nominal ending of the feminine plural *-en*, the ablaut marking in the negative perfective, and the noun *e-sen ‘tooth’. Some of these cases may be understood from the elision of *t described above, but this would be unlikely for the negative perfective marker and, in view of Afroasiatic cognates, less desirable for *e-sen (cf. Semitic *sinn). Thus, as it stands, there is some good evidence for the reconstruction of *e in Proto-Berber, although one suspects that further investigations could succeed in eliminating these last few cases.¹¹

As for its reconstruction into Proto-Berber, there exists little doubt that the allophone [e] of *a is a very old feature, as its reflexes are found all over Berber.

12. The accent

Berber languages of Morocco and Algeria (except Tuareg) do not seem to have a system of word accent. Instead, accentual features are governed by higher level prosodic organization, which one could call intonation. The situation is different in the Berber languages of Libya and Egypt, and in Tuareg. Heath (2005) presents us with the first full-scale analysis of accent in any Berber language. The recent outburst of studies on Siwa in Egypt has brought much data on accentual patterns in this language, although a full analysis is still outstanding. Van Putten (2014a) provides us with a well-argued overview of the system in Awjila based on older literature, while Mitchell (2009) gives due attention to accentual factors in Zwara.

There is therefore a lot of evidence to make a large-scale comparison of accentual systems possible, but no such endeavor has been undertaken yet. In one (important) detail, however, it has been shown that some quirks of Berber accentual systems can be reconstructed into proto-Berber. This concerns the accentuation of Aorist and Perfective aspectual forms. As shown by Brugnatelli (1986), a number of Libyan varieties have stem-initial accent in the Aorist of disyllabic verbs, while the accent is on the second syllable of such verbs in the Perfective. This distribution is not found in Tuareg, but it does occur in Tetseret, a language of Niger closely related to

11. One should note that there is no evidence for an ancient phoneme /e/ in Zenaga. However, at least some of the forms that have /e/ in other Berber varieties have a high vowel in Zenaga (e.g. in the negative Perfective). Thus, while there is no way to distinguish *e from *i in this language, the reflex of *e is clearly different from *a and *ã.

Zenaga (Lux 2013: 284ff.). In view of the unexpected distribution among the forms, and of its presence in languages that are both linguistically and geographically far apart, there is little doubt about the archaic nature of this phenomenon.

13. A reconstruction of the Proto-Berber phoneme system

The Proto-Berber phoneme system can be reconstructed as follows.

13.1 Consonants

Single consonants

	d	t	ɖ	gʸ?	kʸ?	g	k	ɠ	ʔ
β	f	z	s	ʒ					
m	n								
	r								
	l			y		w			

Geminate consonants

	dd	tt	tt [†]	ggʸ?	kkʸ?	gg	kk	qq
	ff	zz	ss	ʒʒ				
mm	nn							
	rr							
	ll			ğğ		gğ [‡]		

[†] In view of the Zenaga evidence, maybe rather *ɖɖ

[‡] In view of the Awjila evidence, maybe rather *ww

13.2 Vowels

Reconstruction 1 (assuming kʸ and gʸ are positional variants of k and g)

short vowels	plain vowels
ĩ	i
ũ	u
ă	e
	a

Reconstruction 2 (assuming kʸ and gʸ are different phonemes from k and g)

short vowels	plain vowels
ə	i
ă	u
	e
	a

*e is probably an innovation, but this seems to have taken place before the dialectal differentiation in Berber.

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