

Talking Neolithic: The Case for Hatto-Minoan and its Relationship to Sumerian

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It is argued that the Minoan language of second-millennium BC Crete stands a good chance of being descended from the language that was imported into Crete by the earliest farmers that colonized the Island in the 7th millennium BC. Evidence is presented that links Minoan to the Hattic language of second-millennium BC northern Anatolia. An analysis of the Hattic verbal system supports the hypothesis that in turn Hattic is related to Sumerian. The existence of a Hatto-Sumero-Minoan language family is posited, which predates the expansions of Semitic and Indo-European in the Near East and which is implicated in the spread of migrant farmers into Europe. A word for 'pig' is reconstructed for that language family.

1. Language, genes and culture

The expansion of a language across a geographical area takes place as a result of two mechanisms: the language is taken along by people who migrate into new territory, or the language is adopted by local populations beside or instead of their original language. Before the times of widespread formal education, mass media and the internet, language spread by acculturation always went hand in hand with spread by migration: only the presence of migrant native speakers in a new territory is capable of exposing the natives to the new language and of creating social pressure to adopt that language. Exposure and social pressure are what it takes for a population to trade its native language for a different one. Yet the ratio according to which migration and acculturation contribute to language shift in individual cases may vary strongly. In the modern period, acculturation has played a more important part than migration in the expansion of English in Ireland, Wales and Highland Scotland at the expense of native Gaelic and Welsh, and in the spread of French at the expense of Breton. So

it was with the spread of Latin throughout the Roman Empire in the early centuries AD. In North America, intercontinental migration led to replacement rather than acculturation of Native American populations, and the spread of English in North America owes more to migration and segregation than to acculturation of Native Americans. On the other hand, the fact that English rather than the other immigrant languages managed to impose itself as a standard language mainly *was* the result of acculturation among the immigrant groups.

The ratio according to which migration versus acculturation played their parts in effectuating language shift is of relevance to our ability to align linguistic history with data from archaeology and evolutionary genetics. The more a language shift was accompanied by the migration of speakers into a new territory, the larger the impact of those migrants on the local gene pool and the local material and non-material culture, and the larger the chances that modern scholars may recover that language expansion went hand in hand with the expansion of material culture and genes. Conversely, if a language expanded largely as a result of acculturation, the accompanying signal in the gene pool and the material culture is weak and hence difficult or impossible to recover by modern scholars working on remote time periods.

It is unquestionably the case that the adoption of agriculture in Europe during the early Neolithic period (ca. 9000-7000 BP) constituted a major cultural and demographic break with hunter-gatherer life that existed previously and, depending on the area involved, continued alongside it for a longer or shorter period. It was a cultural break in the sense that resources, the calendar of activities throughout the year and the mindset required to be a successful agriculturalist were of a completely different nature, and a demographic break in the sense that successful agriculture allowed a manifold increase of the population.¹

¹A recent study that underlines the marked population increase that went hand in hand with the arrival of Linear Pottery Culture in Central Europe and the extremely low levels of Mesolithic population prior to this arrival is Shennan - Edinborough (2007).

The theme of this article is identifying the potential linguistic impact of the early Neolithic in Europe. It is a long-standing and widespread opinion among archaeologists that the early expansion of the Neolithic in a northwestern direction, from Anatolia into Greece, across the Balkans and following the river courses into Central Europe (Linear Pottery Culture), owed more to migration (demic diffusion) than to acculturation (the record for the western expansion, across the Mediterranean, into Spain and then northwards through France, is less clear but seems to have involved more acculturation).² In accordance with this opinion, the Neolithic expansion that stretched from Anatolia to the Linear Pottery Culture in Central Europe was largely the product of migrant farmers who from generation to generation expanded the area of cultivated land.³ These are circumstances predicting that the expansion of Neolithic culture was accompanied by the spread of language and genes from Anatolia. And indeed potential genetic signals have been identified that attest to this expansion.⁴ Ever since Renfrew (1987), the idea that the Neolithic expansion into Europe between ca. 8500-7000 BP can be identified with the expansion of the Indo-European language family has been popular among many - but by no means all (notably Mallory 1989; Anthony 2007) - archaeologists. This idea received support from research by people who applied to language history phylogenetic methods developed for dating evolutionary change in biology (Gray - Atkinson 2003), while others working in that field dissented on methodological grounds that affect the possibility of dating branches on genealogical language trees (Evans *et al.* 2006). Pereltsvaig and

²Günther *et al.* (2015) is an important genetic study that strengthens the case for immigration over acculturation, however.

³A recent survey of calibrated ¹⁴C datings of Neolithic sites showed that the Neolithic expansion progressed by leaps rather than uniformly (Bocquet-Appel *et al.* 2009).

⁴Haak *et al.* (2010) investigated ancient DNA from Linear Pottery Culture burials and identified links with the Near East and Anatolia. Fernández *et al.* (2014) studied ancient DNA from Near Eastern Pre-Pottery Neolithic burials and confirmed genetic expansion from this area across Anatolia and into Europe. Balaesque *et al.* (2010) studied Y-chromosome microsatellite variation of haplotype R1b1b2, which they linked to the Near East (but see Busby *et al.* (2012) for a critique).

Lewis (2015) is an important recent study that is highly critical of applying Bayesian phylogenetic methodology to language history. Most linguists as well as archeologists who are aware of historical linguistics reject the idea that Indo-European spread so early, mainly and most persuasively because of the fact that ancestral Proto-Indo-European had words for items that do not appear in the archaeological record until approximately 6000 years BP at the earliest, so that the spread of Indo-European and the accompanying disintegration of Proto-Indo-European must be dated later than that (Darden 2001; Anthony 2007: 59-82).

2. About this article

The theme of this article is to identify the language or languages involved in the early Neolithic expansion into Central Europe. Its starting points are two relatively conservative assumptions. First of all that the spread of the Neolithic from Anatolia into Central Europe following a northwesterly route was accompanied by the expansion of one or more languages that originated in Anatolia or thereabouts. My second assumption is that chronological problems attached to the idea that that language(s) was/were Indo-European are such that we should keep an open mind to any alternative.

The article progresses by what I shall argue to be a series of reasonable assumptions (rather than compelling evidence). Confirmation of those assumptions will be strengthened by the fact that many of them are independent of one another yet they conspire to form a coherent picture of the past. The justification of this approach lies in its end result rather than in each individual step. This is an accepted methodology in the decipherment of scripts and languages: each individual step in the decipherment of the Linear B script, for instance, was no more than a reasonable assumption, whose validity was only then demonstrated when all assumptions were compounded in the idea that Linear B encoded second-millennium BC Greek and when that idea was applied to the texts. I can claim no such spectacular results, only the demonstration that the methodology is potentially fruitful.

The argument proceeds by a number of individual strands, which at the same time structure the article: demonstrating the

significance to the question at hand of the Minoan language of the Linear A texts from Crete (section 3); identifying linguistic similarities between Minoan and the Hattic language of North-Central Anatolia (section 4); identifying linguistic similarities between Hattic and Sumerian (section 5-6); determining the relevance of those data to the language(s) of the early Neolithic farming communities in the Near East (section 7) and in Europe (section 8); and finally a case study about a word for 'pig' (section 9).

3. Neolithic and Bronze-Age Crete

On a quest to identify the language of the first Neolithic farmers who spread from Anatolia into Europe, one can do worse than start by investigating the prehistory of Crete. A relatively remote island that required considerable seafaring skills to reach, it was part of the first 'wave of advance' of Neolithic farmers into Europe, who colonized the island between 7000 and 6500 BC in full possession of the early Neolithic package of cereals, legumes and domesticated animals (Broodbank & Strasser 1991). Until recently there was no hard evidence for a human presence on Crete before the Neolithic (Broodbank 2006), but we now know on the basis of an analysis of lithic artefacts from the Plakis region that a Mesolithic horizon was present that dates to c. 9.000-7.000 BC and centered on coastal wetlands (Strasser *et al.* 2010).⁵ What is not clear is whether the people who produced the artefacts were permanent residents rather than seasonal visitors, or whether this population persisted until the Neolithic settlement. However that may be, given the cultural gulf that separated the early Neolithic farmers from their Mesolithic hunter-gatherer neighbours and their demographic advantage over them, it seems clear that the Neolithic migrant farmers who settled on Crete, bringing their language along with their genes and culture, formed the deepest linguistic stratum on the island, which was unlikely to have been wiped out by the language(s) of previous inhabitants. This scenario receives support from a

⁵A palaeolithic horizon dating to c. 190.000-130.000 BP provides a spectacularly early date for seafaring, but since it predates the development of modern humans it is irrelevant to the issue at hand.

recent study revealing a remarkably high incidence among modern Cretans of mitochondrial DNA haplogroups that can be linked to haplogroups which were recovered from Pre-Pottery Neolithic burials in the Near East (Fernández *et al.* 2014).

Since Crete is a large and relatively remote island, its Neolithic inhabitants may reasonably be expected to have been less exposed to linguistic newcomers than inhabitants of most landlocked areas in the Mediterranean basin. It is therefore not unreasonable to suppose that when the first evidence for written language emerges around the turn of the third to the second millennium BC, that language (or those languages) descend(s) from the language of the earliest Neolithic migrants. Herein lies the importance of Crete for the question of identifying the language of the first farmers that spread westward from Anatolia by the end of the eighth millennium BC. Let us therefore have a closer look at those ancient Cretan scripts.

The earliest texts that survive from Crete date from the first half of the second millennium BC. Two larger corpora can be identified by their different scripts, the so-called 'Hieroglyphic' texts and the Linear A texts. Both probably encode related languages or dialects, which are of largely unknown structure and of unclear further affiliation (Duhoux 1996). The scripts do not have obvious forerunners outside the island, so they probably represent local inventions for the benefit of economic administration. We have a better understanding of Linear A than of 'Hieroglyphic'. The Linear A script makes use of logograms (symbols that denote a meaning) and syllabograms (symbols that denote sound in the form of syllables consisting of consonant + vowel). Since the Linear B script, which encodes Greek and can therefore be read and understood, is closely related to Linear A and many signs in the two scripts overlap formally, it is reasonable to think that the sound values of Linear A syllabograms approximate those of their Linear B counterparts. Various tests suggest that this assumption is correct in general but not demonstrably so in every individual detail (Packard 1974: 67-111; Duhoux 1989: 84-90). Within the framework of this article, justice cannot be done to the full complexity of this issue. I have adopted the common practice of transliterating Linear A signs that possess known

Linear B counterparts as if they have their Linear B sound values (in the case of syllabograms) and semantic values (in the case of logograms).

A few hundred Linear A texts survive, most of them in fragmentary form. The large majority deals with the administration of goods and people, but the presence of texts on a great variety of objects indicates widespread use of the script for various purposes. The language of the Linear A texts is named Minoan. Next to nothing is known about the structure of Minoan or of the meaning of its words. Although many have tried their hand at linking the language to known languages, no attempt has met with even the semblance of agreement among specialists.⁶

Within the context of the present article, it is useful to discuss a few relevant features of Minoan of which we do have knowledge.⁷

(1) A number of sacrificial vessels have been found in cultic contexts, mostly in mountain-top sanctuaries. These are called libation tables. Some contain formulaic inscriptions, which were studied by Duhoux (1992). At the head of many inscriptions stands a highly inflected word. It consists of a chain of prefixes and suffixes surrounding an unchanging core *-i-jo-*. That core probably represents the lexical root. Linguistic typology suggests that this is a verb and that the prefixes and suffixes may encode some or all of the following elements: actants (subject, direct and indirect object), local reference markers (e.g. preverbs), negations, conjunctions, and tense, mood and aspect markers. A morphological analysis of the clitic sequences is as follows:

1	2	3	4	root	a	b	c	d
	a -	ta -	na -	t +	i-jo +	wa -	t -	ja - nu
	ja				u		i	
							e	

⁶Special mention may be made of the proposal that the language may be close to (Indo-European) Luvian (Palmer 1968; Finkelberg 2001; but see the extensive critique by Duhoux 2004).

⁷See Schrijver (2011) for a more extensive discussion of these features.

Complex polysynthetic verbs of this kind are relatively rare in the languages of present-day Europe, North Africa and the Middle East. The closest modern counterpart is found in Abkhaz and Circassian, which belong to the Northwest Caucasian language family. Ancient examples are the early form of Celtic underlying Irish and British Celtic, which belong to the Indo-European family, and the isolated languages Hattic and Sumerian, which will be discussed later. As the examples show, the fact that Minoan probably had a complex verb does not enable us to assign it to a particular language family. It is, in the terminology of Johanna Nichols (1996), a type-identifying rather than an individual-identifying feature. Languages that did not originally possess a complex verb may develop one (Celtic), and languages that developed one may subsequently lose it again (Celtic again, as witnessed by Modern Irish and Modern Welsh).

Given the nature of the objects on which this Minoan verb is found and in view of the many parallels in first-millennium BC dedicatory inscriptions across the Mediterranean, *-i-jo-* is bound to mean something like 'give, dedicate, offer, sacrifice'.

(2) The administrative tablets from Hagia Triada contain a relatively frequent word that can be transcribed, using Linear B values, as *sa-rja*. In tablet HT 102, which deals with large quantities of a cereal, *sarja* occurs as part of a list that also contains the logogram VIR for 'man or woman'. Each item of that list is followed by a number, which expresses either the amount of cereal or the number of individuals receiving or delivering cereal. The numbers are summated by the phrase *kuro 1060* 'total 1060'. Since lists of this kind enumerate similar items and this particular list contains both *sarja* and a word meaning 'man or woman', *sarja* probably denotes a kind of person or, possibly, domestic animal (if the tablet deals with food rations). Another tablet, HT 94a, provides a list of types of person followed by their numbers, which are summated as *kuro 110* 'total 110'. It continues with the word *sarja*, which is immediately followed by rations of cereal, figs and wine. Those rations pertain to 100 of the 110 people, or to be precise, to the people listed by the logogram VIR for 'man or woman' (62), by the logogram *86 (20) and by the complex logogram composed

of ‘person’ and the sign *313b (18). What then follows are the higher rations of the same foodstuffs, which are allotted to the remaining people, who in the list appear as the complex logogram *TI+A* and the logogram *TA*. Since they receive a larger ration, they may be very tentatively labelled as ‘supervisors’.⁸

The combined evidence of these two tablets suggests the following meaning of *sarja*. On the basis of HT 102, the probable meaning can be narrowed down to a denotation of a type of person or livestock. On the basis of HT 94a, the meaning ‘livestock’ can be eliminated, while the meaning ‘(kind of) person’ makes sense. The context strongly suggests that the meaning of *sarja* is a relatively general term for different types of persons who constitute a workforce and are entitled to a standard ration of foodstuff, so something like ‘people, workers, labourers, workforce’.

In order to be as explicit as possible I should point out that it is impossible to exclude the possibility that *sarja* means something much more specific, such as ‘(people belonging) to Mr *Sarja*’ or ‘(people) from a place called *Sarja*’. If that is the case, we would be as wrong as can be in ascribing a meaning ‘people’ to *sarja*. One might object to this alternative by pointing out that it would be an odd list that subsumed the very specific terms ‘(people belonging) to Mr *Sarja*’ or ‘(people) from a place called *Sarja*’ and the general logogram for ‘man or woman’ under the same heading, as HT 102 does. But as Packard (1974: 40-41) already pointed out, the existence of lists that contain lexically very different items cannot be easily dismissed. He provided the following hypothetical but realistic list:

<i>Workers</i>	
At Phaistos	40
Bakers	30
With John	20
Total	90

⁸See Schrijver (2014: 25-31) for a detailed analysis of this tablet.

He also pointed to the real existence of such disparate lists from Larsa (Sumeria) dating to around 1800 BC.

It is fair to say that this is a salutary caution. It is also fair to say that the idea that *sarja* might mean something like '(people belonging) to Mr *Sarja*' or '(people) from a place called *Sarja*' does not fit in well with the context of HT 94a: it does not make sense that a totalled list of people and the rations allotted to 100 of those people are linked to one another by *sarja* meaning 'to Mr *Sarja*' or 'from the village of *Sarja*'. Whereas it does make sense if *sarja* means something like 'workers'. While the latter meaning of *sarja* is a reasonable assumption, the former is not. As I stated in section 2, this article progresses by reasonable assumptions rather than individually compelling arguments.

On the basis of arguments internal to Minoan, we have established as probable that Minoan had a complex, polysynthetic verb; a verbal root *ijo* meaning approximately 'give'; and a noun *sarja* probably meaning 'people, workers' *vel sim*.

This is what we need to progress towards the second pillar of the argumentation, Hattic: Hattic has a complex, polysynthetic verb; a verbal root *ja* meaning 'to give'; and a word *zariu-* meaning 'mortal, human being'. This is certainly not enough to establish beyond reasonable doubt that Minoan is related to Hattic, but it at least shows a typological affinity to Hattic as well as a formal agreement in two items of basic vocabulary among the grand total of five or so Minoan words whose approximate meaning is known.

4. Hattic

Hattic is a language of unknown affiliation that has been extinct since the second half of the second millennium BC. The language served as a language of ritual, religious song and mythology in the heartland of the Hittite kingdom, in present-day north-central Turkey east of Ankara. It is generally assumed to represent a native language of the area dating from before the expansion of Indo-European Hittite. Texts are written in the local variant of the cuneiform script. Their context is always Hittite: they were found in the Hittite archives of historical Hattušas (modern Boğazkale) and in modern Ortaköy, and many of them

form part of bilingual Hittite-Hattic tablets. The most important tablets, which offer a key towards understanding the language, are those few that preserve a Hattic text alongside a Hittite translation. The complete corpus consists of hundreds of tablets, almost all of which are preserved in a fragmentary state. They date from the Old Hittite to the Young Hittite period (17th-13th century BC). Important studies of Hattic grammar and lexicon are Soysal (2004), Klinger (1994, 1996: 615-633), Schuster (1974, 2002), Girbal (1986), Kammenhuber (1969) and Dunaevskaja (1961). Since our knowledge of the language is extremely fragmentary, I shall present the most relevant grammatical features of the language in some detail and with plentiful examples. In the examples, Hattic text is provided in transcribed form and with a morphological analysis ('=' indicates a morpheme boundary) and morphological glosses (1 'first person', 2 'second person', 3 'third person', sg 'singular', pl 'plural', trsb 'transitive subject', itrsb 'intransitive subject', ob 'object', poss 'possessive pronoun', obl 'oblique case', prep 'preposition', prev 'preverb', conn 'connector', prec. 'precative', imp. 'imperative'). Translations preceded by '(Hitt.)' are translations of the accompanying Hittite rendering of the Hattic text; those preceded by * are not so supported. The spellings *wa_a*, *we_e*, *wi_i*, *wu_u* are the usual transliterations of the ligature of the cuneiform sign PI, which in Hittite has the sound value *wa*, and the cuneiform signs for the vowels. The ligature is also used in Hurrian texts, for which it was probably devised. The general though tentative assumption is that the consonant involved is a labial or labiodental fricative (*f* or *v*). References are to the standard editions, *Keilschrifturkunden aus Boğazköi* (KUB) and *Keilschrifttexte aus Boğazköi* (KBo).

4.1. Basic structure of the Hattic noun phrase

A. Hattic has a very limited system of case marking of grammatical and local cases, as the following example shows, in which subject, object and locative are unmarked.

- (1) KBo 37.1 Vs. 3a-4a
Eštan=0 ^{URU}*Lahzan=0* *le=w_eel=0* *a=n=teh*
 Estan Lahzan 3poss.=house a=3sg.trsb.=build
 (Hitt.) 'the Sun divinity built his home in Lihzina'

B. There are two case markers whose use appears to be optional: *-n* and the two written forms *-šu*, *-tu* (also *-du*), which may reflect one and the same suffix /ču/ (this appears to have a short allomorph *-š*, i.e. /č/). Both suffixes usually appear with the function of a genitive marker, but example (2) shows its use as a marker of the (in)direct object. I label both suffixes as markers of the oblique case.

- (2) KBo 37.1 Vs. 7a-8a
 a=n=zaraš=ma ^dKatahziwu_uri=šu
 a=3sg.trsb.=call=conn. Katahziwu_uri=obl.
 (Hitt.) '(s)he (the Sun divinity) called Katahziwu_uri'.
- (3) KUB 24.14 IV + KUB 28.78 IV 19a-22a
 [im]a=llen zar=du [le]=wa_ašunu
 this=like sheep=obl. [its]=soul
 (Hitt.) 'as the soul of this sheep'
- (4) KUB 28.24 Vs.l.Kol. 4'-6'
 wa_a=šhawu_i=n wa_a=šah alip wa=zariu=n wa_a=šah alip
 pl.=god=obl. pl.=evil word pl.=mortal=obl. pl.=evil word
 '*the evil words of gods and the evil words of
 mortals'

C. Hattic prefixes possessive pronouns to their head nouns. The widespread 3sg pronoun is *le=*, which probably is the masculine counterpart of feminine *te=*. It is frequent in genitival constructions of the type 'the man his wife' = 'the man's wife'.

- (5) KUB 24.14 IV 23a'-25a'
 ašah=du le=zuwatu le=i=pinu le=waa=zizintu
 evil=obl. 3poss.=wife 3poss.=pl.=child 3poss.=pl.=grandchild
 '*the wife, the children and the grandchildren of the
 evil (man)'

D. An identical set of local reference markers can be prefixed to nouns (prepositions) and to verbs (preverbs).

- (6) KUB 28.75 Vs. II 4
 ha=wa_a=šhaw_i=pí
 prep.=pl.=god=conn.
 (Hitt.) 'among the gods'

- (7) KBo. 37.1 Vs. 16a
ha=nuw=a=pa
 prev.=come/bring=*a*=conn.
 (Hitt.) 'he came in, entered'

The following example is important for establishing the order of prefixes before nouns. The first plural marker indicates the plural of the possessive pronoun, while the second marks the plural of the noun.

- (8) KBo 37.49 Rs.5'
 [*l*] *e=wa_a=ha=i=pin*
 3poss.=pl.=among=pl.=child
 '*among their children'

4.2. The plural of nouns and verbal actants

While the data presented in 4.1 more or less represent received wisdom, plural formation has been a bone of contention among investigators for a long time. Therefore it deserves a detailed treatment, which cannot be provided in this article. I shall, however, provide ample examples that underpin the following distribution rules of plural markers.⁹

- The nominal prefix *wa_a=* (allomorph *=p=* after vowels and before a single consonant; allomorph *i=* before labial consonants) marks the plural of nouns in all functions except that of the plural object (hence genitives, complements of prepositions, transitive and intransitive subjects); but in combination with a possessive pronoun *eš=* is replaced by *wa_a=/=p=*
- The nominal prefix *eš=* (allograph *aš=*, *iš=*, so probably /š/) marks the plural of nouns that function as object; but in combination with a possessive pronoun *eš=* is replaced by *wa_a=/=p=*
- The verbal prefix *wa_a=/=p=* marks the third person plural of the intransitive subject
- The verbal prefix *eš=* marks the third person plural of the transitive subject

⁹A full treatment will be presented in a forthcoming grammar of the Hittite verb (Schrijver in preparation 2).

The reversal of the functions of nominal (plural object) and verbal (plural transitive subject) *eš=* is striking but descriptively accurate, as the following examples indicate.

Since in examples (9) and (10) both the subject and the object are plural, they do not allow us to decide whether verbal *eš=* refers to the plural subject or to the plural object:

- (9) KUB 2.2 II 40
wa_a=šhap=ma eš=wu_{ur} a=(e)š=ka=hir
 pl.=god=conn. pl.ob.=land a=3pl.trsb.=on=distribute
 (Hitt.) ‘the gods distributed the lands’.
- (10) KBo 37.1 Vs 21a + KBo 37.2 2’
te=i=p eš=pur wa_a=šhap a=š=pu
 pron.=1pl.=pl? pl.ob.=land pl=god a=3pl.trsb.=make
 ‘*the gods make us (and) the lands’ (Hitt.: ‘but the gods make the land and us’)

In the following three instances, however, the object is singular and the transitive subject plural, so that it is clear that verbal *eš=* refers to the transitive subject:

- (11) KBo 37.9 3’-4’ + KUB 28.1 15’
 [] *kattah* [] *Taru* [*katti*] *pala eš=wa_alwa_alat*
 [] queen [] Weather God [king] and 3pl.trsb.=say
 (Hitt.) ‘queen [*name of goddess*] (and) [king] *Taru* [*did something*] and they said ...’
- (12) KUB 24.14 IV+KUB 28.78 IV 19a-25a
ima=lle_n zar=du le=wa_ašunu wa_a=(a)šti pala
 this=like sheep=obl. 3poss.=soul pl.=bird and

pala ašah=du le=zuwadu le=i=pinu le=pa=zizintu
 and evil=obl 3poss.=wife 3poss.=pl.=child 3poss.=pl.=grandch.

 [*l*] *e=i=wa_a=(a)šhezni uk iš=ga=ppuše*
 3poss.=pl.¹⁰=pl.=fox so/as 3pl.trsb.=on=eat
 ‘*as birds and foxes eat the soul of this sheep, (so let them eat) also the wife, the children and the grandchildren of

¹⁰The plural prefix *=i=* is an allomorph of *wa_a* which replaces the latter before labial consonants, as I shall argue in detail in Schrijver (in preparation).

the evil one' (there is a very similar Hittite translation, which just has slightly different syntax)

- (13) KUB 2.2 II 45-46
anna eš=ka=her=pi tabarna[=n katte] le=wa_ael
 when 3pl.trsb.=on=fix=conn. lord=obl. king 3poss.=house
 '*when they (viz. the gods) determine the house of the lord
 king' (the Hittite rendering has 'when we determine ...')

The following examples show that verbal *wa_a/p* marks the intransitive subject.

- (14) KBo 37.1 Vs. 19a-21a + KBo 37.2 1'-2'
te=[wa_a=pu]le zariu=m=pa še=pi[nu]
 prec.=3pl.itrsb=become man=obl.=conn. 3poss.=child

wu_aru=š te=wa_a=pule
 land=obl¹¹ prec.=3pl.itrsb=become
 (Hitt.) 'may they (viz. the innards of the gods)
 become man's child, may they become the land'

- (15) KUB 48.59 1'-4' (beginning of clause lost)
te=p=kunkuhhuw=a le=i(p)=wi_ien
 prec.=3pl.itrsb=live=imp. 3poss.=pl.=child

le=p=zizintu te=p=kunkuhhuw=a
 3poss.=pl.=grandchild prec.=3pl.itrsb=live=imp.
 '*may [...] live, may his children (and) his
 grandchildren live'

F. In the examples under E, the intransitive subject (*wa_a*, *=p=*) and the transitive subject (*(e)š=*) prefixes precede the verb. The presence of these actants is obligatory. In addition, the transitive object may be expressed before the verb, too, but that appears optionally (at least in the case of third person objects), and if it does appear, its position is before the subject prefixes:

- (16) KUB 28.59 I 15'-16'
a=wa_a=n=ta=nu=ma aš=kattah
 a=3pl.ob=3sg.trsb=into=come/bring=conn. pl.ob=queen
 '*he brings the queens in'

¹¹ =š appears to be an allomorph of /ču/; its distributional pattern is unclear.

- (17) KUB 2.2 II 46
n=i=pu=pe zi[š]
 3sg.ob=1pl.trsb=make=conn. mountain
 (Hitt.) ‘and we (viz. the gods) make the mountain’

G. Verbal forms that contain the prefix *tu=*, *šu=* /čü/ have a different actant coding structure: they obligatorily encode the object (and possibly the intransitive subject, see examples below), *not* the transitive subject. The verbal prefix of the 3rd person plural of the object has the shape *wa_a/p*. Its 3rd person singular counterpart is zero (marked 0 in the examples). It is not clear what *tu*-verbals mean. As I shall argue in detail in Schrijver (in preparation), *tu*-verbals possibly function as sub-predicates and express the completion of a goal or an action that is subsequent to the action expressed by the main predicate; ‘so that effectively, in order that effectively’ are possible translations.

- (18) KBo 37.1.Vs. 16a-18a
ha=nuw=a=pa *Hašammil* *tu=p=kargaraš*
 prev=come=a=conn *Hašammil* *tu=3pl.ob.=rake*
- wa_a=šhapu=n* $[l^2]i(=)$ *wa_a=wa_a=škel*
 pl=god=obl 3poss.[?]=pl.=pl.=innards
 (Hitt.) ‘Hašammil came in (and) raked in the innards of the gods’
- (19) KBo 37.49 Rs 12’-13’
tu=wa_a=p[pu *wu_ar*]*u=n* *te=wa_a=katti*
tu=3pl.ob=make land=obl 3poss=pl=king
 (Hitt.) ‘she (viz. the goddess Eštan) made them kings of the land’
- (20) KUB 2.2 II 40-41
šu=0=wa_a ^{URU}*Hattuš* *tittah=zilat* *šu=wa_a*
šu=3sg.ob=put Hattuša (town) great=throne *šu=place*
 (Hitt.) ‘they (viz. the gods) put in Hattuša the great throne they put’

- (21) KBo 37.49 Rs 14'-15'
 [t]u=0=miš tabarna le=wu_ur tu=[0=miš
 tu=3sg.ob=take lord 3poss=land tu=3sg.ob=take
 tab]arna le=liš
 lord 3poss=lifetime
 (Hitt.) 'the lord took his land, the lord took his lifetime'

Here follow possible examples of intransitive 3rd plural subjects marked by (e)š= . All are from monolingual texts, so that we have little control over their exact meaning:

- (22) KUB 28.82 Vs II 2' tu=š=hel 'they proliferate'? cf. hel
 'proliferate, spread out' (Soysal 2004: 280)
 KBo 2.24 6' du=š=ta=nu 'they come in'? cf. ta=nu
 'come in, bring in' (Soysal 2004: 297)
 KBo 21.109 Vs II 8' šu=š=ta=kunn(=)a 'they are
 visible'? cf. kun(u) 'be visible' (Soysal 2004: 290)

H. Hence *tu*=verbs obligatorily express the object (3rd plural *wa_a*=, =*p*=) and possibly the intransitive subject (3rd plural (e)š=?). Additionally, the transitive subject may be expressed too, but its appearance, at least in the case of third person actants, is optional. If it appears, it is placed *before* *šu/tu* and the object prefixes:

- (23) KUB 28.77 Vs. I 14-15, with additions from KBo 15.118
 u(=š)=šu=0=ppu wu_ur=tu te=put
 2.tr.sb(=pl.)=šu=3sg.ob=make land=obl 3poss.=population

 palakatte
 and king
 '*you/ye make the population of the land and the king'
- (24) KUB 28.87 7'
 wa_a=tu=0=tuh
 1.trsb=tu=3sg.ob.=hold
 '*I hold it': Soysal (2004: 264, 906, 972) cites the Hittite translation from an unedited Ortaköy text: Or. 90/1693 III 6', 7': [ha]rmi 'I have, hold'

non-*tu*-verbals (accusative system): intransitive subject = *wa_a/p*=
 (examples 14-15)
 transitive subject = *eš*=
 (examples 9-13)

For the sake of convenience, all information about encoding of 3rd person actants in the Hattic verb is summarized in Table 1.

Hattic: 3rd person actants	<i>ergative</i>	(trsb=) <i>tu</i> =ob=verb <i>tu</i> =itr sb =verb		<i>accus- ative</i>	(ob)=trsb=verb itr sb =verb	
	<i>obligatory expression</i>	<i>position in prefixal chain</i>	<i>morpheme</i>	<i>obligatory expression</i>	<i>position in prefixal chain</i>	<i>morpheme</i>
object	yes	after <i>tu</i> =/š <i>u</i> =	sg. =Ø= pl. = <i>wa_a/p</i> =	no	before trsb	sg. (<i>a</i>) <i>n</i> = pl. <i>wa_a/p</i> =
itr. subject	yes	after <i>tu</i> =/š <i>u</i> =	sg. =Ø pl. =(e)š=?	yes	before verb	sg. Ø pl. <i>wa_a/p</i> =
tr. subject	no	before <i>tu</i> =/š <i>u</i> =	sg. (<i>a</i>) <i>n</i> = pl. <i>wa_a/p</i> = or (e)š-??	yes	before verb	sg. (<i>a</i>) <i>n</i> = pl. (e)š=

Table 1

At this point it becomes necessary to call attention to the fact that Sumerian has a verbal system that in many respects resembles the Hattic system.

5. The Sumerian verb

Sumerian is a language of unknown affiliation, which is attested as a spoken, living language through texts dating from the late fourth and third millennia BC and produced in the southern floodplains of the Euphrates and Tigris, in what is now southern Iraq. It died out as a spoken language around the beginning of the second millennium BC, but remained in use during the last two millennia BC as a language of literature and learning. Texts are written in proto-cuneiform and cuneiform script. A long tradition of scholarship has opened up its extraordinarily complex philology and provided an extensive knowledge of its grammar and lexicon. Jagersma (2010) is the first systematic attempt to describe fully the grammar of Sumerian on the basis of third-millennium and early second-

millennium sources, whilst it was still being spoken as a native language.

Sumerian has a system of split ergativity (Jagersma 2010: 295-6; 359-366). Perfectives (traditionally designated as preterite or *ḥamtu*) follow ergative alignment, encoding object and intransitive subject in the same position in the affixal chain, viz. after the verbal stem. The transitive subject appears before the verbal stem:

(actant slot 1 2)
transitive subject = VERB = intransitive subject or object

Imperfectives (also known as present-future or *marû*) show accusative alignment, encoding the intransitive subject and the transitive subject in the same position in the affixal chain, viz. after the verbal stem. The object appears before the verbal stem:

(actant slot 1 2)
object = VERB = transitive subject or intransitive subject

In order to make a comparison with the Hattic system more transparent, a comparable diagram of the Sumerian coding of 3rd person actants in the verb is provided (Table 2).

Sumerian: 3rd person actants	<i>ergative</i> : (perfective inflection)	trsb=verb=ob verb=itrbs	<i>accusative</i> : (imperfective inflection)	ob=verb=trsb verb=itrbs
	<i>position in morpheme prefixal chain</i>		<i>position in morpheme prefixal chain</i>	
Object	after verb root	sg. Ø pl.human eš	before verb root	human <i>n</i> non-hum. <i>b</i>
itr. subject	after verb root	sg. Ø pl.human eš	after verb root	sg. Ø pl. human eš
tr. subject	before verb root	sg. human <i>n</i> pl. human <i>n</i> ... eš non-hum. <i>b</i>	after verb root	sg. <i>e</i> pl. human enē

Table 2

For two languages to have a system of split ergativity is no more than a typological similarity, which tells us nothing about affiliation. In the case of Hattic and Sumerian, however, similarities go beyond typology:

- (1) split ergativity is expressed by actant coding in a polypersonal verb, not by case marking of nouns
- (2) the relative order in which verbal actants are expressed is identical: transitive subject precedes object/intransitive subject in ergative alignment; object precedes transitive/intransitive subject in accusative alignment
- (3) a number of actant affixes show remarkable formal similarities: note the similar phonological shapes of the 3sg. intransitive subject \emptyset , the 3sg. transitive subject *n*, the 3pl. subject *eš*
- (4) in the accusative part of the system, both Hattic and Sumerian use the same positional slot for intransitive and transitive subjects of the third person but distinguish them by different morphemes, thus showing a tripartite system (but it should be noted that both languages use different morphemes, in spite of 3)
- (5) if Hattic *tu*-verbals indeed are sub-predicates expressing the completion of a goal or action that is subsequent to the action of the main predicate (e.g. 'that they will/would effectively [make, place, take]'), that can be characterized as an instantiation of perfective aspect, in which case there is semantic overlap between Hattic and Sumerian in their use of ergative and accusative alignment.

The most significant difference between Hattic and Sumerian is the position of the verbal root with respect to the two affixal actant slots: in Hattic the verbal root precedes both slots, while in Sumerian the first slot precedes and the second slot follows the verbal root.

The similarities are so striking that they cannot be explained by typology alone. In other words, they are individual-identifying rather than type-identifying features in the terminology of Nichols (1996: 48), which means one of two things: Hattic and Sumerian share features because they are related to one another; or because they have been in contact, i.e. the ancestor of the one borrowed from the ancestor of the other. Given the fact that the similarities go beyond the pattern copying that is usual in contact situations and extend to the phonological shape of verbal affixes, it is not credible that the

similarities are due to contact. That leaves the hypothesis that Hattic and Sumerian are related.

6. Other similarities between Sumerian and Hattic

Encouraged by this result, we may attempt to identify other features that link both languages and can be classified as individual-identifying.

6.1. Possessive predicative construction

In Hattic, the notion of ‘to have’ is expressed in a non-trivial way in the following example:

(25a) KBo 37.50 Vs. I 6’

$u=wa_a=zar$ [] $te=u=p$
 2sg.poss.=pl.=sheep $te=2=pl$

(Parallel Hittite text: KBo 25.122 Rs. III 12’) ‘your sheep (are) yours’, i.e. ‘the sheep are yours, you have the sheep’

The analysis of $te=u=p$ is not entirely clear. Its translation is based on the Hittite rendering. Apparently, in order to express ‘X has Y’ Hattic uses the construction ‘Y’s X are Y’s’. The same construction is found in Sumerian:

(25b) Cyl A 8:19; L; 22, Jagersma 2010: 717-8¹²

ĝiskim=**ĝu₁₀**=**θ** **nu**=**ĝu₁₀**
 sign=my=abs. not=my

The word for word translation is ‘my sign is not mine’, which means ‘I am without a sign, I do not have a sign’.

6.2. Possessive pronoun as conjunction

In Hattic, the 3rd person possessive pronoun also functions as a connector which joins two semantically similar nouns. In the first example it is combined with the conjunction *pala* ‘and’:

¹²Sumerian is transcribed in bold typeface according to Jagersma’s conventions (2010). Non-italicized forms are logograms (indicating meaning rather than sound), while italicized forms are syllabograms (indicating sound).

- (26a) KUB 24.14 IV+KUB 28.78 IV 19a-25a (cf. Girbal 1986: 102-117)
wa_a=(a)šti pala [l̄²]e=i=wa_a=(a)šhezni
 pl=bird and 3poss=pl=pl=fox

The Hittite rendering (see example 12) simply has ‘birds and foxes’, while a literal rendering of Hattic would be ‘birds and their foxes’. The first of the plural morphemes in ‘their foxes’, =i=, marks the plural of the possessive pronoun, while the second, =wa_a=, indicates the plural of ‘fox’.

The following example shows the same construction but without the conjunction *pala* ‘and’:

- (26b) KBo 37.1 lk. Kol 24-26 + KBo 37.2 4'-6' (Klinger 1996: 642-3; Schuster 2002: 158-9)
a=m=pušan šahiš le=parnulli
 a=3sg.trsb=fan (wood) 3poss=(wood)

a=m=pušan ki[] le=kurtabí
 a=3sg.trsb=fan (reed) 3poss=(plant)
 (Hitt. KBo 37.1 r.Kol. 23-25): ‘and she (the goddess Kamrušepa) fanned the *šahi* wood and the *parnulli* wood, and she fanned the sweet reed and the *happuri*’

In Sumerian, the non-human possessive pronoun *bé* ‘its’ also means ‘and’ (as well as ‘this’), see Jagersma (2010: 97-99):

- (26c) FAOS 5/2 Luzag. 1 2:6-7; N; 24 **idigna buranun-bé**
 literally ‘Tigris its Euphrates’, i.e. ‘Tigris and Euphrates’
 (26d) VS 14:52 4:4-5; L; 24 **gú.mun šúm.GUD=bé**
 literally ‘cumin its onions’, i.e. ‘cumin and onions’

In Sumerian, if the possessive *-be* is used as a conjunction, it can be combined with the comitative marker =*da*, thus showing a double marking that is comparable to the combined appearance of the possessive and *pala* ‘and’ in Hattic:

- (26e) Cyl B 17:10; L; 22 **íd idigna íd buranun=bé=da**
 literally ‘river Tigris with its river Euphrates’, i.e. ‘the rivers Tigris and Euphrates’

6.3. Lexical correspondences

Clear lexical correspondences between Hattic and Sumerian, i.e. words with similar sound and meaning, are conspicuously lacking. One reason for that may be our very limited knowledge of the Hattic lexicon. Soysal (2002: 274-330) provides the meaning of no more than approximately 175 different lexemes, which is an optimistic maximum, for many meanings are uncertain. Another reason is developments in Sumerian. Our present-day knowledge of Sumerian phonology is largely based on second-millennium BC sources, dating from a period when Sumerian had already died out. There are indications that sound change between the 3rd and 2nd millennium has been significant. If those changes are reversed, look-alikes between Sumerian and Hattic do appear:

- (27) Sumerian 2nd millennium é ‘house’ < 3rd millennium /haj/ (Jagersma 2010: 48), cf. Hattic *wa_ael* ‘house’
- (28) Sumerian 2nd millennium **udu** ‘sheep’ < 3rd millennium /ut^sa/ (Jagersma 2010: 43), cf. Hattic *zar* /t^sar/ ‘sheep’
- (29) Sumerian 2nd millennium **ša** ‘heart, innards, belly’ < 3rd mill. **ša.g** /ʃak/ (Jagersma 2010: 125), cf. Hattic *š(a)kel* ‘innards, heart’

Yet these lexical similarities are too few and far between to support the affiliation between Sumerian and Hattic by themselves. It is only in combination with the individual-identifying evidence presented by a comparison of grammar that the lexical evidence gains potential importance.

In general, both Sumerian grammar (apart from the evidence discussed earlier) and lexicon are very different from their counterparts in Hattic. That is of no consequence for establishing affiliation, however, because affiliation is established exclusively on the basis of similarities, to be more precise, similarities that are such that they cannot readily be explained by accident, typology or borrowing (see further Nichols 1996: 48-56).

7. Hatto-Sumerian and its relevance to the language of the early Neolithic farming communities in the Near East

In summary, a renewed study of the Hattic verbal system has revealed that this is so similar to the Sumerian verbal system that it reaches the status of an individual-identifying feature, which supports genetic relatedness and allows us to posit the existence of a Hatto-Sumerian language family. Two other syntactic features, the predicative expression of possession and the use of a possessive pronoun as a coordinating connector 'and', have been found to bolster the hypothesis of affiliation. Convincing evidence for affiliation cannot at this point be derived from the lexicon. Nor can such evidence presently be derived from inflexional morphology or grammatical paradigms, although in mitigation it should be stated that neither language has a rich morphology outside the verb or much in the way of grammatical paradigms of the Indo-European or Semitic vein. The hypothesis that Hattic and Sumerian are related is amenable to testing by the application of the standard Comparative Method (e.g. Nichols 1996) in order to reconstruct their common ancestor, Proto-Hatto-Sumerian. At the same time it is clear that formidable complications stand in the way of rapid progress: the complex philology of Sumerian, especially in as far as the script interferes unfavorably with establishing sound values of morphemes and lexemes of third-millennium Sumerian; and our rudimentary knowledge of grammar and lexicon of Hattic.

As third-millennium BC Sumerian was gradually being engulfed by the expansion of Semitic in the Near East, so Hattic fell victim to the expansion of Indo-European in Anatolia, probably during the early centuries of the second millennium BC. As explained earlier, Sumerian and Hattic probably are the last remnants of a language family that may have stretched from Anatolia to southern Mesopotamia. They form part of a linguistic landscape that antedates the spread of Indo-European and Semitic and that probably had its roots at least as far back as the fourth millennium if not earlier. The dissimilarity of Hattic and Sumerian in many aspects of grammar and lexicon may suggest a greater time depth for the common proto-language than the fourth millennium, although it should be added that language change does not operate according to the

linguistic equivalent of a molecular clock, and short bursts of intensive change may alternate with long periods of relative stability, as the history of the Indo-European language family amply shows. However this may be, since Hatto-Sumerian lies at the heart of the area from which the full early Neolithic package of cereals, pulses and livestock started its spread by the ninth millennium, it is potentially significant for determining the affiliation of the language(s) of the farming communities of that period. To be sure, no less than five millennia separate those early farming communities from the Hatto-Sumerian landscape that may be posited for the fourth millennium BC, a period that may have seen several language families come and go. It is at this point that the evidence of Minoan, such as it is, becomes relevant: although still tentative, there are indications that Minoan may be a western outpost of this Sumero-Hattic language family. If that is correct, and if it is reasonable to assume that Minoan goes back to the language of the earliest Neolithic settlers of the island in the seventh millennium, as I have argued, the case for Hatto-Sumerian being the language family of at least some of the early farming communities in the Middle East is strengthened.

8. Hatto-Sumerian and the language(s) of the first European farmers

Since the expansion of the early Neolithic way of life from Anatolia into Southeastern and Central Europe probably went hand in hand with an expansion of genes and language, the idea that the migrant farmers spoke a form of Hatto-Sumerian whilst still in their Anatolian homeland should be relevant to determining which linguistic traces of that expansion to expect in European languages, namely substratum phenomena in the Indo-European languages of Europe. In Schrijver (1997) I have argued that in those languages a set of items of vocabulary are attested showing a pattern that cannot be reconciled with Indo-European morphology and derivation: addition of a prefix **a-* which is connected to vowel loss or vowel change in the following lexeme. Cases in point are as follows:

- (30) **mesal-* (Latin *merula*, Welsh *mwyalch*) ~ **a-m(V)sl-* (Old High German *amsla*, *amusla*, *amasla*, *amisla*, Old English *ōsle*) ‘blackbird’, cf. Hittite *hazana-* ‘black’ < **ha-ms-ana-*.
- (31) Germanic **laiwaz-* (Old Icelandic *lævirki*, Old English *lāwerce*, Middle Dutch *lēwerke*), Celtic **a-laud-* (Gallo-Latin *alauda*) ‘lark’ (alternation Germanic *-ai-* ~ Celtic *-a-* is another feature of these non-Indo-European words)
- (32) Celtic **straP-* (Old Irish *straiph*, *sraib* ‘sulphur’, *sraif-tene* ‘lightning’ (literally ‘sulphur-fire’)) ~ *(*a-*)*strp-*, *(*a-*)*sterop-* (Gr. (*a*)*strapḗ*, (*a*)*steropḗ* ‘lightning’)
- (33) **garr-* (Welsh *garr* ‘leg’, Basque *garro* ‘tentacle’, Provençal *garra* ‘hollow of knee’) ~ Greek *ákara* ‘legs’ (Cretan word, Hesychius).

Guus Kroonen (2012a: 240, 256; 2012b) has added two more examples:

- (34) **str-* (Old Icelandic *styrja*, Old High German *sturio* ‘sturgeon’) ~ **a-setr-* (Ru. *osëtr*, SCr. *jěsetra* ‘sturgeon’)
- (35) **gedl-* (Greek *gélgīs*) ~ **a-gdl-* (Greek *ágliš* ‘garlic’, possibly Latin *allium* ‘onion’ via **a-(g)dl-*), which Kroonen links to Old Babylonian *gidlu* ‘plaited string of onions and garlic’, assuming this was mediated to Greek via a non-Indo-European language in Anatolia.

To those examples may be added:

- (36) **a-leil-* (Hittite *alel* ‘flower’) ~ **leil-* (Greek *leírion*, Latin *lilium* ‘lily’), ?**lul-* (Albanian *lule* ‘flower’), possibly to be connected to Middle Egyptian *hrr-t*, Coptic *hrêri*, *hlêli*, Berber *ilili* ‘flower’ (if the latter is not a borrowing from Latin *lilium*).

The prefix **a-* and its effects on the vocalism of the word to which it is attached can be compared with the status and effects of the nominal prefix *ha-* in Hattic (Schrijver 2011: 246-249, 254):

- (37) Hattic *ha=praššu=n* (*ha=panther=obl.*; hapax: KBo 37.1 Vs. 30a) ‘of panther(skin)’ ~ Hittite *paršana-*, Old Turkic *bars*, Tatar *pars*, Gr. *párdalis*, Lat. *pardus*, Sogdian *pwrnkn*, Pašto *práng*; possibly also Greek *pánthēr* ‘leopard, cheetah’ < **párthēr*. In Hattic, the vowel of **parš-* is lost (**prš*, written *praš*) after *ha=*.
- (38) Hattic *ha=nwa_aš=uit* (*ha=‘sit’=uit*, KUB 2.2.III: 20) ‘throne’ ~ verbal stem *ta=niwa_aš* ‘sit (down)’ and (verbal or nominal) *ha=niwa_aš*, *ha=nwa_aš* (in monolingual texts, cf. Soysal 2004: 442, 445). In the word for ‘throne’, the vowel *-i-* of *niwa_aš* is lost after *ha=*.

Finally, Sumerian may be added to this lexical complex on the basis of the following etymon:

- (39) Sumerian 2nd millennium **urudu** ‘copper’ < 3rd mill. /aruta/ (Jagersma 2010: 61), cf. ‘European’ substrate **a-rud-*, **raud-* ‘ore’ in Germanic **arut* (e.g. Old High German *aruz*), Lat. *raudus* ‘ore’.

In conclusion, it turns out that the idea that Hatto-Sumerian spread into Europe in the wake of the early Neolithic expansion has some explanatory power for this group of European substratum words. This example provides encouragement rather than proof, but it at least legitimizes further studies in this field. One such study will conclude this article.

9. An early term for the domesticated pig

The Minoan tablet known as ‘PH (?) 31a’ in the edition of Godart-Olivier (1976-1985 I p. 318-319) and as ‘HT? 170’ in the edition of Raison-Pope (1994: 134-135) is of unclear provenance: it was found either in the palace of Phaistos or, more probably, in nearby Hagia Triada (cf. Schoep 2002: 121 fn. 114). The tablet presents a list of domestic animals, which are linked to designations of unknown nature (presumably persons or places). Godart-Olivier and Raison-Pope disagree about which side is obverse and which is reverse. I provide the text in transcription:

PH (?) 31 side a (Raison-Pope 1994: HT? 170 side b)
supra mutila

a.1]x a[]
a.2	[]ru	CAP ^m ‘KU’	1
a.2	ma-di	<u>OVIS^m</u>	<u>1</u>
a.2		<u>OVIS^f</u>	[1]
a.3	[[?] OVIS ^m	1
a.3	ku-pa ₃ -nu	au-re ‘SI’	1
a.3-4	pa-ta-da	[[?] OVIS ^m]
a.4		[[?] OVIS ^f] <u>1</u>
a.4	ku-ro	CAP ^m ‘KU’	1
a.4		OVIS ^m	5
a.4		OVIS ^f	3
a.5		[au-re ‘SI’	[?] 1]

There is a long gap in line 1, which probably contained designations of persons or places followed by items of livestock. Since line a.4 contains a totalled list of livestock (introduced by *kuro* ‘total’) and the rest of the text contains enough room for 3 male and 2 female sheep, line a.1 probably listed 2 male and 1 female sheep, and possibly an *au-re*. The beginning of line a.5 is damaged but contains enough room to have accommodated the expected *au-re* ‘SI’ followed by a number.

The point of interest is *au-re* ‘SI’, which, given the nature of the tablet, designates a livestock animal. The reading *au-re* ‘SI’ is mine: Godart-Olivier (V 208, 271) reads AU ‘*si-re*’ (or rather, because they do not commit themselves to sound values, the numerical equivalents of those signs in standard numerical transcription of Linear A: 85 ‘41-27’). Raison-Pope (1994: 29, 135) regard the three signs as a single complex logogram. The way in which it is written on the tablet leaves little doubt about a reading *au-re* ‘SI’, however: the signs for AU and RE follow one another and are of roughly equal size, whereas the sign for SI is written small and on top of AU, indicating that it (and not RE) qualifies AU. Since the sign AU has the shape of an animal’s head and functions as the logogram for ‘pig’ in Linear B (and presumably in Linear A, where it is attested in HT 38.2 and HT 118.1), it is generally assumed that that is its function in this Linear A tablet as well. The new reading modifies that in the sense that we are confronted here with the *word au-re* rather than the *logogram* AU,

in other words, that *au-re* is the Minoan word for pig. Hence the use of AU as a logogram for pig represents the principle of acrophony, which was also applied in other cases, most famously in the logogram for ‘figs’, NI, which is an abbreviation for the Minoan word for figs that survives as a substratum word in the Cretan Greek *nikúleon* ‘kind of fig’ (Neumann 1962). The same word for ‘pig’ can probably be found in b.4 of the same tablet, where it is damaged: only part of AU and part of SI written over it are preserved.

In order to dispell doubts that the word for ‘pig’ indeed is *au-re*, it is relevant to consider a tablet from Khania, KH 6.

KH 6

.1	[x (x)] *303 ‘D’	J
.1	di-si[-x x x]
.1-.2		[]
.2	[]te-nu-re[x x (x)]
.3	[x (x)]ki-sa-ne	*303 ‘D’	J
.3		*347	[1 [?]
.4	[x (x)]	*303 ‘D’	J
.4	ri-ta-je	*303 ‘D’	[J]
.5	[x x (x)]	CAP ^m	1
.5		*303 ‘D’	J
.5		BOS	1
.5-.6	<u>pa</u> [?] /te [?] []re	1
.6		*334	1
.6		*303 ‘D’	J
.6-.7	pi-sa [x (x)]	*303 ‘D’	1
.7		au-re-te	1
.7		*306	1
.8	8 CYP 2 JB		

Readings follow Godart-Olivier (1976-1985 III 27, V 78) and Raison-Pope (1994: 162-163), with one exception. Both authorities read the numeral ‘1’ after []re in line 6 and after *au-re-te* in line 7 as a punctuation mark. This is arbitrary: the vertical strokes in lines 6 and 7 are identical in shape, position and length to the vertical strokes at the beginning of lines 7 and 5, both of which *are* interpreted as ‘1’ by the editions. It seems that the guiding principle of the editions was that a vertical stroke after a

logogram means ‘1’ and after a syllabogram means ‘punctuation mark’, which is consistent at least for this tablet but it is no justification. Reading ‘1’ rather than the punctuation mark is supported by the fact that it brings structure to the tablet, as follows. Each entry starts with a series of syllabograms, which probably represents a place or person. In all preserved cases, this is followed by the logogram *303 ‘D’ and a numeral, which represents a cereal (wheat or barley) in a specified quantity that is either the fraction J (= 1/2) or 1.¹³ This leads us to suspect that the lacunae in lines 1 and 2 contained *303 ‘D’ plus a numeral, too. In addition to *303 ‘D’, some entries contain another logogram or a word, which in all preserved cases is followed by the numeral ‘1’. Judging by the presence of CAP^m ‘male goat’ and BOS ‘cow’ and by the fact that they are followed by whole numbers rather than fractions, this is a list of livestock (Schoep 2002: 125-126, also on the function of the logograms *334 and *306 as indications of types of livestock; *347 is a *hapax*, which, given its present context, represents an animal, too). This interpretation suggests that a logogram designating an animal has been lost in the long gap in line 1, after *di-si*[. If that is correct and if we read []*re* 1 and *au-re-te* 1 (rather than punctuation marks), the total number of animals is eight, which happens to be the number that appears at the end of the tablet in line 8, suggesting that line 8 contains a summation. Disappointingly, however, the quantity *303 2 JB = 2 2/3 cannot possibly be the sum of the quantities of *303 ‘D’ listed on the rest of the tablet because the preserved entries already make a total of $5xJ + 1 = 3 \frac{1}{2}$. It may be significant that line 8 shows the simple logogram *303 rather than the combined logogram *303 ‘D’ that appears in the list. Although it is unclear what the meaning of the fractional symbol ‘D’ in this combination is, one might speculate that *303 ‘D’ and *303 stand in a particular ratio to one another.

However much remains obscure about this tablet, what seems clear is that []*re* and *au-re-te* are designations of farm animals. Since the general terms for sheep, goats and cows are known to be represented by different Linear A characters, it stands to reason that []*re* and *au-re-te* either designate pigs, being

¹³See Schrijver (2014: 1–24, with references) for a discussion of the values of Minoan fractions.

the only other domestic animal at the time, or a particular *variety* of cow, sheep or goat (e.g. ewe, lamb, kid, ram, etc.). The former possibility is supported by *au-re* ‘*Šl*’, which was discussed earlier, and by the existence of a logogram AU meaning ‘pig’ in Linear A (only Hagia Triada) and Linear B. Accordingly, it may be suggested that []*re* can be restored to [au-]*re* ‘pig’. *au-re-te* appears to be a suffixed form of *au-re*. The context suggests that *au-re-te* is a type of pig (piglet, sow, boar), but apart from that the function of the suffix *-te* is obscure.

Valério (2007) argued that there is a case suffix *-te* ‘of, from’ on the basis of the formula *a-di-ki-te-te du-pu₂-re* on libation tables, which he interpreted as ‘master (*du-pu₂-re*) of (*-te*) mount Dikte (*a-di-ki-te*)’. Given the fact that one other instance of the formula contains *ja-di-ki-tu* rather than *a-di-ki-te-te du-pu₂-re*, it is not unreasonable that *a-di-ki-te-te* is an inflected form containing a suffix *-(e)te*, but Valério’s translation as a genitive is no more than a possibility. If Valério’s general interpretation is approximately correct, *-te* might just as well be a possessive pronoun: ‘of Dikte *its* master’. In the light of the hypothesis that Minoan may be part of the Hatto-Sumerian language family, this theoretical possibility may be explored more seriously than would otherwise be the case. The assumption that Minoan had a 3rd person possessive pronoun *te* ties in with the existence in Hattic of a feminine 3rd person possessive pronoun *te=*. The fit is both formal and syntactical. ‘Of Dikte *his/her* master’ is the Hattic way of expressing a genitival construction: see examples (3) and (5) above, which contain the 3rd person masculine counterpart of *te=*, possessive *le=*. In this sense, the use of possessive *te* in the Minoan example would bring us close to Valério’s suggestion that *te* means ‘of’, but the Hattic evidence suggests that this is only part of the wider functional spectrum of possessive *te*.

Let us apply those competing ideas (*-te* as case suffix or *-te* as possessive pronoun) to *au-re-te*. Interpreting *-te* in *au-re-te* as a case marker lacks obvious plausibility: for one, why would it not be attested in the other animal name written with syllabograms, []*re*? Interpreting *-te* as the feminine possessive pronoun, at first sight just as implausible, does make sense, however, again in light of Hattic, where the possessives *=le* (masculine) and *=te* (feminine) can be suffixed to nominal bases, in which case they lose the vowel and express male and female persons: *šai=l*, *še=l*

‘lord’ versus *šai=t, še=t ‘lady’ (Soysal 2004: 306, 307; stem /tšai-/). According to this scenario, Minoan *au-re-te* would mean ‘sow’ rather than ‘piglet’ or ‘boar’.

The existence of a Minoan possessive morpheme *te* that is also used to derive designations of females can be supported by independent evidence from Minoan. Valério (2007: 10) aligned *a-di-ki-te-te* with *ja-di-ki-tu*, which also occurs on a libation table (IO Za 2) and shares enough syllabic signs to render the idea that both chains contain the same lexeme probable. He compared the pair *ja-di-ki-tu* ~ *a-di-ki-te-te* with the pair *ja-su-ma-tu* (SY Za 2; it occurs in the same positional slot of the libation formula as *ja-di-ki-tu*) ~ *wi-ja-su-ma-ti-ti*-*319 (HT Zd 157, part of a wall inscription), which suggests that *te* may alternate with *ti*, for whatever reason. The significance of this alternation is that the syllabogram TI (rather than TE) is used in ligature with the logograms OVIS ‘sheep’ (*21^f) and CAPER ‘goat’ (*22^f) in order to designate the female of the species. Valério (ibid.) also drew the form *a-tu-ri-si-ti* (KN Zb 5, a single word on a vase) into the picture, which he compared to the place name *Tylissos*, Linear B *tu-ri-so*. Its meaning according to Valério would be ‘from Tylissos’, referring to the vase and/or its contents. According to the interpretation that *-ti* belongs to a semantic complex surrounding the 3rd person feminine possessive *te*, the meaning would be approximately the same but a more literal morphological analysis would be ‘she (of) Tylissos’, where ‘she’ refers either to the vase if the Minoan term for it was feminine, or to the contents of the vase if that was expressed by a feminine word.

Since it makes sense to compare Minoan *te* with the third person feminine possessive *te* in Hattic, one wonders if Minoan also has a counterpart of the Hattic third person masculine possessive, *le*. If so, it should appear as Minoan *re* (assuming that Linear A like Linear B lacks different symbols for /l/ + vowel and /r/ + vowel). There is indeed a suitable candidate. One of the standard slots of the libation formula contains various different words, four of which end in *-re* (*o-su-qa-re*, *ja-su-ma-tu-re*, *tu-ru-sa-ra₂*(-)314-*re*, [.]*te-ja-re*). Duhoux (1992: 78-81) suggested that these may be compared to frequent words ending in *-re* that appear in administrative tablets alongside indications of persons. Hence he proposed that those words denote persons (names of

professions). This function of *-re* may be compared to the function of Hattic *l(e)* in *šai=l* 'lord'. What is more, Duhoux found a suffix *-re* in texts in the 'Hieroglyphic' script which he suggested may have been used to derive anthroponyms or terms of affiliation (1998: 6-7). He compared this functionally to the Greek derivative suffix *-ios*, i.e. 'belonging to' the headword.

It almost goes without saying that no step in the argumentation presented above is unassailable. My point here, as throughout the article, is rather that a series of reasonable assumptions leads to a coherent account of the data, and in particular also to the conclusion that what little information can be independently gleaned from Minoan sources sits well with the hypothesis that Minoan is cognate with Hattic.

Let us finally return to the word for 'pig' in Minoan. We found that the general term is *au-re* and the word for 'sow' is *au-re-te*. There are no immediately transparent cognates in Hattic (where the word for 'pig' is unknown) or in Sumerian (*šaha* 'pig' seems to be a different lexeme altogether). In light of the idea that Hatto-Sumerian spread out over Central Europe during the early Neolithic, the question arises whether anything like Minoan *au-re* surfaces as a substratum word in the Indo-European languages of Europe. There are two contenders. The first is the Greek word for 'furrow', accusative singular *aúlaka* (Hesiod, Pindar, etc.) beside *ōlka* < **awolka* (Homer). These are usually reconstructed either as ablauting **awlk-* ~ **awolk-* or as **awlk-* with dialectally different vocalisations of the syllabic *-l-* to **la* and **ol*. Either would stem from a root noun based on Proto-Indo-European **h₂welk-* 'to drag' (Lithuanian *vilkti*; Schindler 1972: 34, *LIV*² 289-290). This would be eminently plausible were it not for the four alternative Greek forms that do not match this reconstruction or any other reconstruction based on an Indo-European inheritance (van Beek 2013: 290): Doric *eulākā*, the form *áloka* attested in the tragic poets, and *aulákha*, *ólokes* in Hesychius. Therefore, van Beek (2013: 290) and Beekes (2010 s.v.) were no doubt correct in rejecting an Indo-European origin. I suggest that **aulak-*, **awolk-*, etc., are based on a derivative in **k* of the Minoan word for 'pig', **aule*, written as *au-re* in Linear A. For the semantic connection of 'pig' with terms connected with plowing one may compare Late Latin **soccus* 'plowshare' in French *soc*, which was borrowed from

Celtic **sukkos* (masculine), **sukkā* (feminine) ‘pig’ > Welsh *hwch* ‘sow’, Breton *hoc’h* ‘pig, boar’, Old Irish *soc* ‘pig’s snout, plowshare’. The six different forms in which the Minoan term was adopted in Greek suggest that the alien phonetics of the Minoan form precluded a one-on-one mapping on the Greek sound system. If this etymology is correct, it represents the second instance in which one of the numerous Greek words that lack an Indo-European etymology can be connected with a Minoan word (the first being the Minoan acronym NI = Greek *nikúleon* discussed earlier).

The other item is a non-Indo-European term that is attested in Lithuanian *kiaĩlė* ‘pig’ < **keul-*, *kuilỹs* ‘boar’ (with unclear vocalism), which Eric Hamp connected with the first part of the name of the Middle Welsh literary figure *Cul-hwch* (< **keulo-sukko-*), whose birth is associated with pigs (Hamp 1986). The initial **k-* in these forms suggests that the form that gave rise to Minoan *au-re* originally had an initial velar or post-velar consonant that lacked a precise counterpart in Indo-European.

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