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The Indo-Uralic verb

C.C. Uhlenbeck made a distinction between two components of Proto-Indo-European, which he called A and B (1935a: 133ff.). The first component comprises pronouns, verbal roots, and derivational suffixes, and may be compared with Uralic, whereas the second component contains isolated words, such as numerals and most underived nouns, which have a different source. The wide attestation of the Indo-European numerals must be attributed to the development of trade resulting from the increased mobility which was the primary cause of the Indo-European expansions. Numerals do not belong to the basic vocabulary of a neolithic culture, as is clear from their absence in Proto-Uralic (cf. also Collinder 1965: 112) and from the spread of Chinese numerals throughout East Asia. Though Uhlenbeck objects to the term "substratum" for his B complex, I think that it is a perfectly appropriate denomination.

The best candidate for the original Indo-European homeland is the territory of the Sredny Stog culture in the eastern Ukraine (cf. Mallory 1989). If we can identify Indo-Hittite and nuclear Indo-European with the beginning and the end of the Sredny Stog culture, respectively (cf. Kortlandt 1990: 138), Uhlenbeck's view can be unified with Gimbutas' theory of a primary homeland north of the Caspian Sea and a secondary homeland north of the Black Sea (cf. 1985). What we have to take into account is the typological similarity of Proto-Indo-European to the North-West Caucasian languages. If this similarity can be attributed to areal factors (cf. Kortlandt 1995: 94), we may think of Indo-European as a branch of Indo-Uralic which was transformed under the influence of a Caucasian substratum connected with the Maykop culture in the northern Caucasus. We may then locate the Indo-Uralic homeland south of the Ural Mountains in the seventh millennium BC (cf. Mallory 1989: 192f.) and perhaps identify the Khvalynsk culture on the middle Volga as an intermediate stage before the rise of the Sredny Stog culture in the fifth millennium BC.

The Indo-European verbal system appears to combine Uralic flexional morphemes with Caucasian syntactic patterns. Holger Pedersen already argued that the subject of a transitive verb was in the genitive [= sigmatic nominative] case if it was animate and in the instrumental case if it was inanimate while the subject of an intransitive verb and the object of a transitive verb were in the absolutive [= asigmatic nominative] case

form (1907: 152), that the endings of the perfect and the thematic present originally belonged to the flexion of intransitive verbs and the “normal”, mostly athematic endings to the flexion of transitive verbs (1933: 311–315), and that the intransitive and transitive flexion types correspond to the Hittite flexional paradigms in *-hi* and *-mi* (1938: 80–85). Beekes has shown that this theory explains the origin of the Indo-European nominal flexion in its entirety (1985). Knobloch however identified the Indo-European thematic vowel in verbal paradigms *-e/o-* with an object marker (1953). Elsewhere I have integrated these findings into a coherent whole, arguing that the Indo-European thematic flexion of the verb can be compared with the objective conjugation of the Uralic languages and that this hypothesis explains the distribution of the thematic flexion in Hittite and Sanskrit as well as the rise of the thematic subjunctive (1983a, cf. now Nikolaeva 1999 on the remarkably similar system in Ostyak). In the following I intend to examine the Indo-Uralic origins of the Proto-Indo-European verbal system which has thus been reconstructed. Since the Indo-European laryngeals apparently developed from uvular obstruents, I shall write $*q_1$, $*q_2$, $*q_3$ in order to facilitate comparison with the Uralic data. Note that $*d^h$ stands for a lenis dental stop.

My reconstruction contains the following Indo-European verbal paradigms (1979: 67, 1983a: 312, also Beekes 1995: 252, for the dual endings see Kortlandt 1998):

I. athematic present (dynamic, subjective, imperfective)

1sg.	<i>-mi</i>	1pl.	<i>-mes</i>
2sg.	<i>-si</i>	2pl.	<i>-tq₁e</i>
3sg.	<i>-ti</i>	3pl.	<i>-(e)nti</i>

II. athematic aorist (dynamic, subjective, perfective)

1sg.	<i>-m</i>	1pl.	<i>-me</i>
2sg.	<i>-s</i>	2pl.	<i>-te</i>
3sg.	<i>-t</i>	3pl.	<i>-(e)nt</i>

III. thematic aorist (dynamic, objective, perfective)

1sg.	<i>-om</i>	1pl.	<i>-omo</i>
2sg.	<i>-es</i>	2pl.	<i>-ete</i>
3sg.	<i>-et</i>	3pl.	<i>-ont</i>

IV. thematic present (dynamic, objective, imperfective)

1sg.	<i>-oq₁</i>	1pl.	<i>-omom</i>
2sg.	<i>-eq₁i</i>	2pl.	<i>-etq₁e</i>
3sg.	<i>-e</i>	3pl.	<i>-o</i>

V. perfect (static, perfective)

1sg.	$-q_2e$	1pl.	$-me$
2sg.	$-iq_2e$	2pl.	$-e$
3sg.	$-e$	3pl.	$-(\bar{e})r$

VI. stative (static, imperfective)

1sg.	$-q_2$	1pl.	$-med^h q_2$
2sg.	$-iq_2o$	2pl.	$-d^h we$
3sg.	$-o$	3pl.	$-ro$

The six paradigms were originally interconnected by a network of derivative, not flexional relationships. While the stative supplied a middle paradigm to intransitive verb stems, the transitive middle paradigm combined the endings of sets II and VI (cf. Kortlandt 1981: 128):

VII. transitive middle

1sg.	$-mq_2$	1pl.	$-med^h q_2$
2sg.	$-stq_2o$	2pl.	$-td^h we$
3sg.	$-to$	3pl.	$-ntro$

Note that the system looks like the remains of a much more elaborate, but perhaps more regular structure.

The most probable grammatical correspondences between Indo-European, Uralic, and other possibly related language families have conveniently been summarized by Joseph Greenberg (2000). The following items from his list are in my view definitely Indo-Uralic (I retain Greenberg's numbering):

1. first person $*m$,
4. second person $*t$,
8. demonstrative $*i/e$,
11. demonstrative $*t$,
12. demonstrative $*s$,
14. dual $*ki$,
15. plural $*t$,
16. plural $*i$,
24. accusative $*m$,
25. genitive $*n$,
26. dative $*ka$,
29. locative $*ru$,
30. locative $*n$,
31. locative $*i$,
33. ablative $*t$,

- 36. diminutive **k*,
- 38. nominalizer **i*,
- 39. nominalizer **m*,
- 42. participle **n*,
- 43. participle **t*,
- 44. participle **nt*,
- 45. participle **l*,
- 46. verbal noun **s*,
- 53. conative **sk*,
- 54. reflexive **u/w*,
- 56. negative **n*,
- 60. interrogative **k*.

After this rather lengthy introduction, I now come to the chief part of my paper, which is a comparison of the reconstructed Indo-European verbal system with its Uralic counterpart. There are two major problems involved here. On the one hand, the shallow time depth of the Uralic data does not allow a reconstruction of the Proto-Uralic verbal system but only of (some of) its components. This deficiency is mitigated by the relatively conservative character of the Uralic languages. On the other hand, the great antiquity of the earliest Indo-European evidence is to some extent invalidated by the radical changes which took place under the influence of the presumably Caucasian substratum. I start from the assumption that the Proto-Indo-Uralic vowel system was identical with the one which has been reconstructed for Proto-Uralic (cf. Sammallahti 1988: 481):

i	ü	ĩ	u
e			o
ä		a	

This system was reduced in non-initial syllables:

i	ĩ
ä	a

Moreover, "front and back vowels could not occur together in a (non-compound) word" (Sammallahti, l.c.), so that we can write /i/ for [i, ĩ] and /a/ for [ä, a] in non-initial syllables.

The Proto-Indo-Uralic consonant system cannot easily be reconstructed because the gap between Uralic and Indo-European is huge. I reconstruct Proto-Uralic palatalized /r'/ and /l'/ instead of Sammallahti's spirants /d/ and /d'/ because they pattern like resonants and are reflected as **r* and **j* in Samoyedic and as **l* and **l'* in Finno-Ugric (cf.

Sammallahti 1988: 485, 511f., 518, 532), cf. also the variation between Proto-Finno-Permic **šülki* and Proto-Ugric **sül'ki* 'saliva'. I prefer to write Proto-Uralic **q* for Sammallahti's /x/, which is strongly reminiscent of the Indo-European laryngeals (being lost before a vowel and vocalized before a consonant in Samoyedic and lengthening a preceding vowel before a consonant in Finno-Ugric) and may represent more than a single phoneme. Thus, I arrive at the following Proto-Uralic consonant system:

p	t	c	k	q
	s	ś		
m	n	ń	ŋ	
	r	r'		
	l	l'		
w		j		

Unlike Uralic, Indo-European had three series of stops, conventionally written **t*, **d*, **d^h*, etc. The difference between fortis **t* and lenis **d^h* is in my view the result of a secondary development, conditioned by the tonal patterns of strings of morphemes (cf. Lubotsky 1988: 4–7). It is reminiscent of Verner's law in Germanic and similar phenomena in other languages. Though I do not intend to discuss lexical correspondences here, I would like to adduce seven Indo-Uralic etymologies which seem particularly attractive to me (cf. Kortlandt 1989a, Sammallahti 1988: 538, 542, 550f.):

- (1) **meqi-* 'give, sell', PIE. **mey-* 'exchange';
- (2) **moški-* 'wash', PIE. **mesg-* 'sink, wash';
- (3) *(*q*)*aja-* 'drive', PIE. **q₂eg'-* 'drive';
- (4) **teki-* 'do', PIE. **d^heq₁-* 'put';
- (5) **toqi-* 'bring', PIE. **deq₃-* 'give';
- (6) **weta-* 'pull', PIE. **wed^h-* 'lead';
- (7) **wiqi-* 'take', PIE. **weg^h-* 'carry'.

It appears that no simple sound laws can be established. While it is probable that the Indo-European distinction between palatovelars **k*, **g'*, **g^h* and labiovelars **k^w*, **g^w*, **g^{wh}* arose when the distinctive timbre of the following vowel was lost (as happened in Ethiopic), the relation between velars and uvulars remains unclear. In particular, the correspondence of Uralic **moški-*, **teki-*, **toqi-*, **wiqi-* with Indo-European **mesg-*, **d^heq₁-*, **deq₃-*, **weg^h-* suggests that the distinction between velars and uvulars is due to a secondary development. If we look beyond Indo-Uralic to the Altaic languages, we should expect that the uvulars developed from velars before back vowels and that the original

distribution was obscured by the reduction of the vowel system in non-initial syllables. While Indo-European looks like the development of a Uralic system, the latter looks like having developed from an Altaic system. I therefore take the Uralic distribution of **k* and **q* to be probably more original and assume for Indo-European secondary fronting in **weg^h-* < **wiqi-* and secondary retraction in **d^heq₁-* < **teki-* (see further below). The rounded laryngeal **q₃* of Indo-European **deq₃-* < **toqi-* suggests that the non-initial vowel was rounded as a result of Indo-Uralic vowel harmony in this root.

Greenberg rightly points out that Indo-European **i* and **u* represent not only syllabic **y* and **w* but also original vowels which alternated with **e* and **o* (2000: 34–39), though his examples are largely incorrect (cf. Kortlandt 1985 and 1987: 222). For the present purpose it suffices to adduce the relevant instances from Greenberg's list of Indo-Uralic morphemes (see above):

1. first person **-mi* beside **m*,
4. second person **-si* beside **t* (see below),
8. demonstrative **i-* beside **e-*,
14. dual **-i* beside **-e* beside **-q₁* (cf. Kortlandt 1991),
16. plural **-i* beside **-es* (see below),
26. dative **g^hi* beside **q* (see below),
31. locative **-i*,
33. ablative **-os* beside **-t* (see below),
38. nominalizer **-i*,
54. reflexive **-o* (see below),
60. interrogative **k^wi-* beside **k^we-*.

Beekes distinguishes three stages in the development of the Indo-European vowel system (1985: 157):

- I. full grade [i.e. non-high] vowels **e* and **o* in stressed syllables only;
- II. introduction of **o* in unstressed syllables;
- III. introduction of **e* in unstressed syllables.

This theory accounts for all types of vowel alternation in the Indo-European nominal inflexion (cf. especially Beekes 1985: 161, 169, 207). However, as I doubt the possibility of *o*-grade in stressed syllables at stage I when all unstressed syllables had zero grade, I would propose the following alternative chronology:

- A. Indo-European vowel reduction, giving rise to full grade **e* under the stress and zero grade elsewhere;
- B. phonetic lowering of **u* (= syllabic **w*) to **o*, giving rise to a full grade (= non-high) vowel in unstressed syllables;
- C. analogical introduction of a full grade vowel in unstressed syllables (e.g. in compounds), which automatically yielded new **o*;
- D. introduction of **o* in stressed syllables (e.g. by decompounding), resulting in a phonemic opposition between /e/ and /o/ under the stress;
- E. analogical introduction of full grade **e* in unstressed syllables, generalizing the opposition between /e/ and /o/;
- F. rise of lengthened grade vowels **ē* and **ō*, yielding the conventional Proto-Indo-European vowel system.

This chronology has the advantage of providing an explanation for the successive stages in the development of the vowel system. It also accounts for Beekes' "difficulty which I cannot explain" (1985: 196) that neuter *i*- and *u*-stems as a rule have *o*-grade whereas masculines and feminines have *e*-grade in the root because the uninflected neuter form was found in compounds, unlike the nominative in **-s* and the accusative in **-m* of masculines and feminines. Moreover, it accounts for the frequent instances of **wo* after a consonant where the semivowel was restored on the basis of an alternating **w*, especially before **i* and **r*, which were syllabic in the zero grade, e.g. in the words for 'two' and 'four'.

We now come to the crucial sound law which identifies Indo-European as a branch of Indo-Uralic: **ti* was assibilated to **si* (as later happened in Finnish). The principal evidence for this sound law consists of three pieces, viz. the 2sg. ending **-si* beside **t-*, the plural ending **-es* beside **-i*, and the ablative ending **-os* beside **-t*. A fourth piece of evidence is the isolated pronoun **sim* for **tim* (cf. Beekes 1983: 219–224). A fifth piece of evidence is the perfect participle, cf. Greek masc. *eidót-*, fem. *iduā* < **-us-iq₂* < **-ut-iq₂* 'knowing', Vedic neuter *-vāt* beside *-ús-*.

The Proto-Uralic pronouns 1sg. **mi*, 2sg. **ti* (later **mu*, **tu* with the suffix **-u* 'self'), 1pl. **me*, 2pl. **te* (later **me-i*, **te-i* with the plural ending **-i*) are attested in the corresponding personal endings **-mi*, **-ti*, **-me*, **-te* (cf. Collinder 1960: 243, 308, Raun 1988: 562), which can be identified with the corresponding Proto-Indo-European athematic endings **-mi*, **-si*, **-me*, **-te*. These endings are directly preserved as **-m*, **-s*, **-me*, **-te* in the athematic aorist (II), where the final **-i* was lost because it was unstressed. In the athematic present (I) the final **-i* was restored on the basis of the independent pronouns at an early stage, while 1pl. **-me* received the additional plural marker **-s* and 2pl. **-tq₂e* was

taken from the thematic present (IV). When the latter substitution took place, it was evidently more important to distinguish between the present (I, IV) and the aorist (II, III) than between the athematic (I, II) and the thematic (III, IV) flexion, which were already differentiated by the thematic vowel in the latter paradigms.

The Proto-Uralic plural suffix was **t* in the nominative and **i* in the oblique cases (cf. Collinder 1960: 237, 297f., Raun 1988: 557f.). The ending **-i* is preserved in the Proto-Indo-European 3pl. ending **-nti* of the athematic present (I), which evidently represents the original nom.pl. ending of the *nt*-participle, like Finnish *laulavat* 'they sing' (cf. Collinder 1960: 243), and in the Proto-Indo-European pronoun, e.g. nom. **to-i*, gen. **to-i-s-om*, dat. **to-i-mus*, abl. **to-i-os*, inst. **to-i-b^{hi}*, loc. **to-i-su* (cf. Kortlandt 1987: 222). The ending **-i* was apparently added to the original nom.pl. ending **-t*, which after the loss of unstressed **-i* yielded **-s < *-si < *-ti*. Thus, the Indo-European ending **-es* represents **-eti*. The correspondence between Uralic and Indo-European is even closer if Janhunen is right that Proto-Uralic **-i* was originally a conjunctive rather than an oblique ending (1982: 29f.) because this explains the Indo-European distribution of **-i* in the pronoun and the participle versus **-es* in the noun. The Indo-European acc.pl. ending **-ns* looks like the Proto-Uralic gen.sg. ending **-n* plus the new plural ending **-s < *-ti*. This suggests that it was created as a definite oblique plural ending after **-n* had developed into a general oblique singular ending (subsequently yielding *n*-stems) in Indo-European. Proto-Uralic gen.sg. **-n* and acc.sg. **-m* were probably limited to definite nouns (cf. Janhunen 1982: 31) and the same must be assumed for the Indo-European acc.sg. ending **-m*. Note that the 3pl. ending **-nti* must be due to restoration because both **t* and **-i* have been preserved. It was evidently built on the 3pl. ending **-nt* of the athematic aorist (II), which will be discussed below.

The Proto-Uralic ablative suffix **-ta* developed into a partitive in Finnish and into an instrumental *-l* in Ugric, though the latter may have lacked the final vowel (cf. Collinder 1960: 287f., Raun 1988: 559). In Indo-European there is an ablative in **-t* which functions as an instrumental in Hittite, which has an ablative in *-z < *-t-s*. There is another ablative in **-os* which also functions as a genitive and earlier apparently as an ergative which became the nom.sg. form of the nominal thematic flexion (cf. Beekes 1985: 176–195). Finally, there is an ablative in **-tos* which evidently represents **-t-os* (cf. Beekes 1985: 181f.). The abl.pl. ending was probably **-ios* (cf. Beekes 1985: 144f.), which reflects plural **-i* plus ablative **-os*. The simplest explanation of all these endings is that the original Indo-Uralic ablative ending **-ta* was replaced by **-ti* in its local use in order to differentiate it from its instrumental use

and then developed into *-s. This explains why *-t is found as a relic in the ablative of the personal pronouns and the o-stems (where it had to be distinct from the nominative ending *-s) and in the Hittite instrumental, whereas we find *-os in the ablative and genitive of the consonant stems and in the nominative of the o-stems. I think that the same *-t survives in the pronominal ending of the neuter o-stems, reflecting the substitution of the instrumental for the ergative with inanimate agents in transitive constructions.

We now return to the Indo-European verbal paradigms cited above. The 3sg. ending *-t of the athematic aorist (II) evidently represents the Indo-Uralic demonstrative *t (no. 11), cf. Indo-European *to- (with o-grade from stage C, see above), which was added to the original zero ending. Note that the endings *-m, *-s, *-t correspond to the oblique endings of the Indo-European pronouns. In Uralic (or rather Uralo-Siberian, cf. Uhlenbeck 1935b, Fortescue 1998, Seefloth 2000) the 3sg. pronoun was supplied by the demonstrative *s (no. 12), e.g. Finnish *hän*, which corresponds to the Indo-European nominative *so (again with o-grade from stage C). The formative suffix of the sigmatic aorist must be derived from the verbal noun in *-s (no. 46, cf. Janhunen 1982: 36). The 3sg. ending *-ti of the athematic present (I) is evidently analogical after 1sg. *-mi and 2sg. *-si. The 2sg. imperative ending *-d^{hi} may represent the original pronoun *ti with restored *t-.

Elsewhere I have compared the difference between the athematic present (I), e.g. Vedic *ád-mi* 'I eat', and the thematic present (IV), e.g. Greek *éd-o-m-ai* 'I will eat', with the distinction between Bulgarian *spj-a* 'I sleep' and *spi mi se* 'I am sleepy' (1983a: 319). While the athematic (subjective) flexion has an agent marker (Vedic *-mi*, Bulg. *-a*), the thematic (objective) flexion has a patient marker (Gr. *-o-*, Bulg. zero), an experiencer (Gr. *-m-*, Bulg. dative *mi*), and a reflexive marker (Gr. *-ai*, Bulg. acc. *se*). It has long been recognized that there is a correlation between thematic flexion and middle voice, as opposed to an athematic active paradigm, in the oldest Indo-European material (cf. Thieme 1929: 53, Renou 1932: 21). I therefore think that the thematic present endings (IV) represent a combination of object, recipient, and reflexive marking. The thematic aorist endings (III) evidently combine the object marker *-e/o- with the agent markers of the athematic aorist (II).

When we compare the thematic present endings with the Indo-Uralic morphemes listed above, the obvious candidate for the 3sg. ending *-e is the demonstrative *e beside *i (no. 8). The characteristic laryngeal *q₁ of the non-third persons may be compared with the dative marker *ka (no. 26) which appears as *g^{hi} in Vedic *máhyam*, Latin *mihī* (cf. Greenberg 2000: 139). Note that the 1pl. ending *-omom may actually

represent $*-omq_1om$, so that the non-third person plural endings may contain Indo-Uralic $*me-ka$ 'to us', $*te-ka$ 'to you'. Since the double full grade vowel in the endings $*-omq_1om$, $*-etq_1e$ cannot be original, the addition of final $*-om$ and $*-e$ must have been recent. The final vowel of the 2sg. ending $*-eq_1i$ may have been taken from the athematic present, perhaps in order to disambiguate it from the derivative suffix $*-eq_1$ which is found e.g. in the Greek passive aorist. The addition of this final $*-i$ must obviously have been more recent than the grammatical differentiation between athematic present and aorist. Thus, we may reconstruct the following paradigm for the thematic present at an early stage (IVa):

1sg.	$-o-q_1$	1pl.	$-o-mq_1$
2sg.	$-e-q_1$	2pl.	$-e-tq_1$
3sg.	$-e$	3pl.	$-o$

This paradigm must be examined in relation to the perfect (V) and the stative (VI).

We may wonder if the thematic present must properly be called transitive or intransitive. I think that this is largely a matter of terminology. In the Bulgarian example *spi mi se* 'I am sleepy', which contains three person markers, a clearly intransitive situation is described by the reflexivization of a 3sg. intransitive verb form with the sole real participant in the dative. I claim that the same construction is found in Indo-European not only in the thematic present, but also in the perfect and the stative.

As in the thematic present, I think that we have a patient marker and an experiencer in the perfect. If the agent was mentioned, it was probably in the dative if it was animate and in the instrumental if it was inanimate (cf. Kortlandt 1983a: 321). Here again, the obvious candidate for the 3sg. ending $*-e$ is the demonstrative $*e$ and the characteristic laryngeal $*q_2$ of the non-third persons may be compared with the dative marker $*ka$. Moreover, I find it difficult to separate the latter from the characteristic suffix of the *k*-perfect in Greek and Latin, which appears to have been its regular reflex after a root-final laryngeal (cf. Chantaine 1961: 162). The reconstructed endings 1pl. $*-me$, 2pl. $*-e$ may actually represent $*-mq_2e$, $*-q_2e$ (cf. Kortlandt 1979: 68), which yields the following paradigm for the perfect at an early stage (Va):

1sg.	$-q_2-e$	1pl.	$-mq_2-e$
2sg.	$-tq_2-e$	2pl.	$-q_2-e$
3sg.	$-e$	3pl.	$-r$

This paradigm differs from the thematic present first of all in the order of the constituent morphemes. It is reasonable to assume that the first part of the ending belongs more closely with the preceding stem while the second part has a more independent status. If we simplify matters by substituting 'I have' for the dative 'to me', we may paraphrase the thematic present as "I have it being changed" and the perfect as "it is me having changed". The distribution of **m* and **t* suggests that these are person markers and that number was originally unmarked, perhaps because the following vowel was lost by the Indo-European vowel reduction (stage A). In the thematic present, **m* and **t* could be confined to the plural on the analogy of the athematic flexion because first and second person were already distinguished by the thematic vowel. In the perfect the same distribution is found in the first person, but not in the second, where the 2sg form was obviously much more frequent than its plural counterpart. The remarkable elimination of the person marker in the plural ending suggests that it was disambiguated from the singular ending, which then must have been homophonous at the time.

This brings us back to the distribution of velars and uvulars in Indo-Uralic. If the Indo-European distinction between palatovelars and labiovelars arose when the distinctive timbre of the following vowel was lost and the uvulars developed from velars before back vowels, we expect e.g. **k' < *ki*, **k'' < *ku*, **q₂ < *ki*, **q₃ < *ku*. Note that **q₁* has a special position because it does not colour a contiguous vowel and is automatic if there is no other word-initial consonant. It has often been identified with a glottal stop. We may then hypothesize that it developed from **k* if no vowel followed. Interestingly, there is some evidence for reduction of laryngeals in word-final position. The Indo-European vowel reduction changed the root structure from **CV(C)CV-* into **CV(C)C-* and, consequently, the suffixal structure from **-CV-* into **-VC-*, with full grade **e* under the stress, *shwa secundum* in unstressed closed syllables, and zero in unstressed open syllables. Final clusters ending in a laryngeal may have originated from medial clusters of any consonant plus **k*, which were particularly frequent (cf. Sammallahti 1988: 492). This accounts for the peculiar loss of laryngeals in compounds and *o*-grade formations, where the final laryngeal was lost before the initial consonant of the second component (cf. Hirt 1921: 185–187). Thus, I think that the particle **g^hi*, the *k*-perfect of Greek and Latin, and the laryngeals **q₁* in the thematic present and **q₂* in the perfect all go back to the same element, which appears as *-k* or *-ka* in Uralic, often followed by other suffixes (cf. Collinder 1960: 296, Raun 1988: 560, also Fortescue 1998: 115).

The principal difference between the stative (VI) and the perfect (V) is the 3sg ending **-o* instead of **-e*. Since the stative was used to

supply a middle paradigm, I think that the ending can be identified with the Indo-Uralic reflexive **u/w* (no. 54), which yielded **-o* in Indo-European (stage B). If **-e* was a patient marker and the preceding element an experiencer in the perfect, the stative is structurally comparable with the Bulgarian example *spi mi se* 'I am sleepy'. Since the **-o* is absent from the 1sg. as well as the 1pl. and 2pl. endings, we must conclude that it was originally limited to the third person. The final vowel of the 2sg. ending **-tq₂o* can easily have been taken from the 3sg. form. The reconstructed 2pl. ending **-d^hwe* may actually represent **-d^hq₂we*, which yields the following paradigm for the stative at an early stage (VIa):

1sg.	<i>-q₂</i>	1pl.	<i>-med^hq₂</i>
2sg.	<i>-tq₂</i>	2pl.	<i>-d^hq₂-we</i>
3sg.	<i>-o</i>	3pl.	<i>-r-o</i>

The corresponding transitive paradigm, where the endings were preceded by an agent marker, is the following (VIIa):

1sg.	<i>-m-q₂</i>	1pl.	<i>-me-d^hq₂</i>
2sg.	<i>-s-tq₂</i>	2pl.	<i>-t-d^hq₂-we</i>
3sg.	<i>-t-o</i>	3pl.	<i>-nt-r-o</i>

This explains the correlation between thematic flexion and middle voice, as opposed to the athematic active paradigm, in the oldest Indo-European material.

The suffixation of the Indo-Uralic reflexive element **u/w* to verbal stems yielded intransitives, middles and passives in Uralic (cf. Collinder 1960: 281). In Indo-European, it seems to have developed an oppositional meaning in relation to first person **m*, as is especially clear in the pronouns, cf. acc. **q₁-me* 'this-me' versus **t-we* 'thee-self', **s-we* 'himself', possessive **q₁-mos* 'this-my' versus **t-wos* 'thy-own', **s-wos* 'his-own', also nom. **q₁e-g'-* 'I' versus **t-u-* 'thou'. This explains why **-o* spread to the 2sg. ending **-tq₂o* but not to the 1sg. ending **-q₂*. It also explains the addition of **-we* in the 2pl. ending. The elements 1pl. **-med^h-* and 2pl. **-(t)d^h-* can be understood as replacements of earlier **-m-* and **-(t)-* before **-q₂* in order to mark the plural subject of the stative. They can be identified as the absolutives (intransitive nominatives) **me-t* and **te-t* which were introduced when the laryngeal had lost its original function and become a simple voice marker. This development could not take place in the perfect as long as **-e* functioned as a subject marker.

In the first person, **u/w* is found instead of **m* in the dual endings (cf. Kortlandt 1998). It is probable that the difference between these two morphemes reflects an original distinction between inclusive and exclusive first person forms, **u/w* meaning 'you and I, ourselves' and **m* meaning 'we as opposed to you' (cf. Ivanov 1981: 21). We also find **u* as a deictic element connected both with the meaning 'self', as in Greek *autós*, and with the second person, in opposition to **k'i* for the first person (cf. Kortlandt 1983b). This meaning of **u/w* as a person marker which distinguishes its referent from the first person **m* now explains the substitution of **o* for **e* as the patient marker in first person forms of the thematic flexion. Thus, the meaning of the 1sg. thematic endings **-om* and **-oq₁* can be paraphrased as 'other by/to me' whereas 2sg. **-es*, **-eq₁i* and 3sg. **-et*, **-e* represent 'this by/to thee/him/her'. The final vowel of the thematic aorist endings 1pl. **-omo* and 2pl. **-ete* looks like a copy of the thematic vowel, and a similar origin may be suspected for the addition of final **-om* and **-e* in the corresponding thematic present endings.

If we call the thematic vowel **-e/o-* an object marker and the perfect ending **-e* a subject marker, we can now summarize the general structure of the seven paradigms discussed above as follows:

Stem-object-agent-recipient-subject-reflexive

This structure may reflect the original order of the clitics from which the endings developed. The chronology of the developments can largely be deduced from the vocalism of the endings. The athematic aorist endings 1pl. **-me*, 2pl. **-te* probably replaced **-m*, **-t* shortly after the Indo-European vowel reduction (stage A) on the basis of the independent pronouns and thereby introduced mobile stress in the verbal paradigm. The athematic present endings apparently developed in order to distinguish the actual present from the timeless aorist in imperfective verbs. The thematic aorist was the corresponding objective flexion, indicating a definite object. The substitution of **o* for **e* in the first person cannot have taken place before the introduction of **o* in stressed syllables (stage D). The thematic present supplied an actual present for the objective flexion of imperfective verbs. It supplied a subjunctive after the introduction of **e* in unstressed syllables (stage E) because this category has *e*-grade in the root. The perfect had final stress but introduced full grade in the root (stage C) and subsequently retracted the stress (stage D) in the singular forms, evidently on the analogy of the athematic present and aorist. The stative had *e*-grade in the root and developed the ending **-o* by the phonetic lowering of **u* in unstressed syllables (stage B). The middle aorist cannot have originated before the

introduction of **o* in stressed syllables (stage D) because it has zero grade in the root. The middle present supplied a dynamic counterpart to the stative after the introduction of **o* in stressed syllables (stage D) and a subjunctive after the introduction of **e* in unstressed syllables (stage E).

The 3pl endings have not yet been discussed because their deviant accent pattern betrays a separate origin (cf Kortlandt 1987: 222). Pedersen already pointed to the possibility of identifying 3pl “intransitive” **-r* and “transitive” **-nt* with the formative suffix of Greek nom. *húdōr* ‘water’, oblique *húdat-* < **-nt-* (1933: 313). Both **r* and **nt* are found as formatives in neuters, collectives, and adjectives (cf Benveniste 1935: 123–128). Interestingly, the accent of the 3pl forms agrees with the oblique cases of the neuter, not with the nominative (cf Kortlandt 2000: 71). I therefore think that the 3pl forms may be compared with English *awry* < *on wry* rather than *wry* ‘turned, twisted’. This explains why the stop in **-nt(i)* was not assimilated to **s*. The same construction is found in the singular of the perfect in **-ēu* (cf Kortlandt 1989b: 111), which represents the locative form of the *u*-stem from which the participle in Vedic *-us-*, Greek *-ot-* < **-ut-* is derived. When we compare the 3pl ending **-(e)nt* with English *-ing* in *agoing* ‘in motion’, the corresponding perfect form in **-(ē)r* can be compared with English *asleep* and identified as a *nomen loci* with the locative suffix **ru* (no. 29). The Avestan ending *-rš* apparently added the nom. pl. ending **-s* after **-r*. No such explanation is possible for the thematic present ending **-o*, which must be derived from the reflexive marker **u/w*. There evidently was an impersonal form with the reflexive **u* in object position which supplied a 3pl form to the thematic present. If we may paraphrase the original meaning of the 1sg thematic present as “I have it being changed” and of the 1sg perfect as “it is me having changed”, the 3sg forms can be derived from “there is it being changed” and “there is it having changed”. We can then identify the 3pl form of the thematic present as “there is being changed”, with reflexive **-o* replacing deictic **-e* and thereby eliminating the 3sg reference. There appear to have been no original 3pl verb forms in Indo-Uralic.

I conclude that the Indo-European verbal system can be understood in terms of its Indo-Uralic origins. Most importantly, the reconstructed endings can be derived from combinations of Indo-Uralic morphemes by a series of well-motivated phonetic and analogic developments. The component parts of the endings either represent original morphemes (*-m*, *-s*, *-t*, *-me*, *-te*, *-nt*, *-q₁*, *-q₂*, *-e*, *-o*, *-r*, *-t-*, *-d^h-*) or were introduced for disambiguation from other endings.

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