Some Consequences of a New Proposal for Subgrouping the IE Family
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This paper will discuss some consequences of the new proposal for subgrouping the Indo-European (IE) family that has emerged from recent work in computational cladistics by Warnow, Taylor, and Ringe. (The methodology itself is not discussed here; see our papers in the bibliography.) The tree in fig. 1 (following the footnotes) is our optimal tree, revised to date; I will assume for the sake of argument that this tree will turn out to be the true tree.

The most obvious consequence is the one implied by the labels of the nonterminal nodes toward the top of the tree. If this is the true tree, then, genetically speaking, Anatolian is half the family. What is more, Tocharian is half of the non-Anatolian subgroup, which I will call 'IE proper'; Italo-Celtic is half of the remainder of that, which I will call 'Nuclear IE'; and it is not until we reach what I have called the 'core' of the family that we find a really rich and diverse pattern of branching. (It is always possible to posit binary branchings among the core subgroups for which we have linguistic information adequate for subgrouping, if certain additional hypotheses are made—namely, the hypotheses of contact expressed by the double-headed arrows. Whether that SHOULD be done is a question I can't address here; therefore I will treat the core as an undifferentiated unit, focussing on the branchings further up the tree.)

It follows automatically that nothing can be reconstructed for Proto-Indo-Hittite (PIH) unless it is attested in Anatolian and at least one other branch; that nothing can be reconstructed for PIE proper unless it is attested in either Anatolian or Tocharian and at least one other branch; and that nothing can be reconstructed for Nuclear IE unless it is attested in Anatolian, Tocharian, or Italo-Celtic (i.e. Italic or Celtic or both) and at least one other branch—and if there WAS very early contact between those branches and Germanic, then at least some features shared only by Germanic and Italo-Celtic have to be excluded. All remaining shared material need be no older than the last common ancestor of the core languages. In particular, note that a feature shared by Greek and Indo-Iranian need not be older than the parent of the core.

This has interesting implications for our reconstruction of IE verb morphology, especially for what I have come to think of as the 'thematic complex'; I will concentrate on that question in the remainder of this paper.

As is well known, there are a few types of thematic verb stems that are unarguably reconstructable for PIH:

stems in *-sḱé/ó- (productive imperfectives in Anatolian; perhaps originally iterative, e.g. in *g^{w}ṃsḱéti 'keeps stepping, walks', *ǵn̥h$_3$sḱéti 'recognizes (every time (s)he sees (it))', *pr̥sḱéti 'keeps asking')

stems in *-ye/o- (primary: cf. Hitt. *weriezzi* 'calls' = Hom. Gk. εἴρει 'says' < *wéryeti, root *werh$_1$- 'say' with regular loss of laryngeal in /C_y)

stems in *-yé/ó- (some primary: cf. Hitt. *tāiezzi* 'steals' = OCS *tajetŭ* (oxytone, cf. Russ. *tajít*) 'conceals' < *teh$_2$yéti—see Melchert 1994:130 on the accent of the Hittite form; some denominative, e.g. Hitt. *gemaniezzi* 'spends the winter', *kappuezzi* 'counts')

stems in *-éye/o- (causative: cf. Hitt. *wassezzi* = Skt. *vāsáyati* = Goth. *wasjiþ* < *woséyeti 'dresses', caus. of *wéstor 'wears')

All these types are characterized by suffixes ending in the thematic vowel.

In a large part of the family we also find 'simple thematic' stems, in which the stem-final thematic vowel is not obviously part of a stem-forming suffix, being either apparently functionless or a mood suffix (marking the subjunctive); but the distribution of such stems across branches is much more uneven.

The clearest case is the thematic aorists.[1] In 1960 George Cardona demonstrated that such a category need not be reconstructed for PIE. Most thematic aorists attested in any branch that have stem-cognates in some other branch can be shown to reflect athematic aorists—that is, they have been secondarily thematized; typical examples include:

Gk. ἔλιπε, Arm. *elik^h* < *élik^{w}ed (see Ringe 1997 on *-d = */-t/), but Lat. *līquit* reflects *leyk^w-; thus the PIE stem must have been ablauting, hence athematic: 3sg. *léyk^{w}t '(s)he left (it)', 3pl. *lik^{w}énd, etc.

Osc. **kúmbened** 'convēnit', but Skt. 3sg. *ágan*, 3pl. *ágman*, reflecting PIE *g^{w}émd '(s)he took a step', 3pl. *g^{w}mént

The same process can be posited for the remainder of the class. If we examine the overall distribution of thematized aorists across the subgroups, the following pattern emerges.

Anatolian: no stems reflecting thematic aorists

Tocharian: TB *lac*, TA *läc* < PT *ləcə́ '(s)he went out' < *h$_1$lud^{h}éd '(s)he arrived', with good cognates elsewhere (see below)

TB *śem* '(s)he came', 3pl. *kameṃ*, clearly thematized within the history of Tocharian (see in general the discussion of Pinault 1994:184-204)

Celtic: OIr. *luid* '(s)he went' (and compounds) < *h$_1$lud^{h}éd '(s)he arrived'

—other suffixless preterites reflect thematization within the history of Celtic, e.g. OIr. *boí* '(s)he was' < *buwed ←< PIE *b^{h}úHd '(s)he became (Skt. *ábhūt*, etc.; see McCone 1991:129-33)

Italic: OLat. *fēced* '(s)he made' < *d^{h}eh$_1$ked '(s)he put', with arguable cognates elsewhere (but see below!)

—other examples reflect thematization within the history of Italic or its subgroups (cf. Osc. **kúmbened** above); Lat. *iēcit* '(s)he threw' (≈ Gk. ἧκε '(s)he sent forth') is of course suspect as a potential rhyme-formation to *fēcit*

the core: well attested in Greek, Armenian, Indo-Iranian, Slavic (the aorist has been lost in Gmc., the system remodelled in Baltic)

—cf. in particular Gk. (Hom.) ἦλυθε '(s)he came' < *éh$_1$lud^{h}ed; reduplicated ἐ(ϝ)ειπε = Skt. *ávocat* < *é-we-wk-e-d, root *wek^w- (underlying *k^w re-

stored on the surface at least in Greek); ἔθηκε '(s)he put' = OLat. *fēced* < *éd^{h}eh$_1$ked (and cf. Late Phrygian αδδακετ 'afficit')?? (But ἔθηκε is really 'alphathematic'; cf. also archaic Boiotian and Phokian ανεθε̄ '(s)he dedicated' (see Dubois 1986 with refs.), and note that the creation of a mixed paradigm is much easier to understand if the aorist with *-k- was ATHEMATIC (Kimball 1991:150-1).)

Thus none are reconstructable for PIH; only *h$_1$lud^{h}éd is reconstructable for PIE proper; and it is very doubtful that *d^{h}eh$_1$ked is reconstructable for NIE (in competition with *d^{h}éh$_1$d, inherited from PIH; cf. Hitt. *tēzzi* 'says', see Melchert 1994: 103 with references). Only in the core languages do we find, PERHAPS, a greater number of thematized aorists that could have been thematized before the individual histories of the surviving branches.

The case of the 'short-vowelled' subjunctive—that is, of those thematic extensions of athematic stems which in NIE express future time, hypotheses, and the like—is similar, but more of its development occurred before PIE proper had diversified much. We find the following distribution of stems.

Anatolian: no category 'subjunctive'

Tocharian: thirty-odd subjunctives in *-e/o-,[2] but only two with clear cognates in other branches:

TB *śamtsi* 'to come', *śämt* 'you will come', TA *śmäṣ* '(s)he will come', *śmeñc* and mid. *śmanträ* 'they will come' < PT *śəm^{y}ətsi, *śəm^{y}ətə, *śəm^{y}ə(ṣə), *śəmën (*-ëñcə), *śəmëntər < aor. subj. *g^{w}ém-e/o-, cf. Skt. *gámati, -anti*

TB *kantär* 'it will be fulfilled', probably < PT *kəñətər < aor. subj. *ǵénh$_1$-e-tor '(s)he will be born' with typical analogical depalatalization of the root-initial consonant (see Hackstein 1995:232-4; remodelled in Gk. γένηται)

—note that many Tocharian subjunctive stems are, or were originally, present stems used also as subjunctives (a major pattern of verb inflection in Tocharian, Winter 1977:136)

Celtic: well-attested in the OIr. s-subjunctive (← s-aorist subj., pace Watkins 1962:124-7, cf. McCone 1991:55-83) and the subjunctive of 'be'

Italic: well-attested in Lat. fut. *erit* and *-bit,* the perfect subjunctive, the OLat. type *faxō,* etc; note further that the 'long-vowelled' subjunctive (i.e. the subjunctive in *-ē/ō- of thematic stems in *-e/o-), which is well-attested in the Latin future, presupposes the short-vowelled type

the core: both short- and long-vowelled types well-attested in Greek and Indo-Iranian

Thus none are reconstructable for PIH, and only *g^{w}émeti and *ǵenh$_1$etor are reconstructable for PIE proper, but the membership of this category increases steadily as we move down the tree. The implications are clear: this was an incipient innovation of PIE proper which became fully productive in NIE.

More or less the same pattern holds for the simple thematic present stems—a fact which Jay Jasanoff and I adverted to independently about three years ago. Again the data speak for themselves.

Anatolian: no simple thematic verbs

Tocharian: thirty-odd simple thematic presents, several of which reflect old presents in *-skḗ/ó-; of the remainder, only three have unarguable stem cognates elsewhere:

Toch. B	Old Irish	Latin	core languages
āśäṃ '(s)he leads'	*·aig*	*agit*	Gk.ἄγει, Skt. *ájati,* etc.
paräṃ '(s)he carries'	*·beir*	*fert*[3]	Gk. φέρει, Skt. *bhárati,* etc.
śaiṃ '(s)he lives'	—	*vīvit*	Skt. *jī́vati,* etc.[4]

TA *prosanträ* 'they are ashamed' is approximately cognate with Skt. *plóṣati* 'burns', OE *frēoseþ* 'freezes', etc., but the root-ablaut does not match —note also the TB subj. *wiśä(ṃ)* '(s)he will avoid', cognate or parallel to Gk. pres. εἴκει 'yields' < *wéyk-e- (with typical analogical depalatalization of the root-initial consonant in TB); but the other subjunctives of this class (except the two noted above) are or can be root-presents thematized within the history of Tocharian[5]

Italo-Celtic: many more examples, especially in Latin (the oldest well-attested language of the group); note the following (I omit stems that show clear signs of secondary thematization):

Latin	Old Irish	core languages
sequitur 'follows'	*sechithir*	Gk. ἕπεται, Skt. *sácate,* etc.
angit 'throttles'	—	Gk. ἄγχει
coquit 'cooks'	—	Skt. *pácati,* etc.
fīdit 'trusts'	—	Gk. πείθεται
legit 'gathers'	—	Gk. λέγει
mergit 'dives, sinks'	—	Skt. *májjati*
pluit 'rains'	—	Gk. πλεῖ 'sails', Skt. *právate* 'flows', etc.
serpit 'crawls'	—	Gk. ἕρπει ('goes'), Skt. *sárpati*
tegit 'covers'	—	Gk. στέγει
tingit 'moistens'	—	Gk. τέγγει
tremit 'trembles'	—	Gk. τρέμει
ūrit 'burns'	—	Gk. εὔει ('singes'), Skt. *óṣati*
vehit 'conveys'	—	Skt. *váhati,* etc.
—	*fo·geir* 'warms'	Gk. θέρεται
—	*·feid* 'brings'	Lith. *vẽda,* OCS *vedetŭ* 'leads'

The cognates cited in the right-hand column show that the situation in the core languages is similar. Once again we seem to be confronting an incipient innovation of PIE proper that became very productive in NIE.

A final piece of this picture is provided by the optative of thematic stems, a well-known crux of IE linguistics. The pattern of optative suffixes in general can be outlined as follows.

Anatolian: no category 'optative'

Tocharian: TA opt. *-i-* for all types of stems, also ipf. *-i-* for most; TB opt. and ipf.

-oy- for a-stems (< *-a- + *-i-), *-i-* for most others; note also the relics ipf. TB *ṣey* = TA *ṣe-ṣ* 'was' < PT *ṣe-i ← *ṣe < *syē < PIE opt. *h_1s-iéh_1d, and likewise ipf. TB *yey* = TA *ye-ṣ* 'was going', ultimately reflecting PIE opt. *h_1i-yéh_1d

—since the productive suffix is PT *-i- < *-ī- < PIE *-ih$_1$-, and not PT *-ę-, which could reflect *-oy- (and would appear in TA as *-e-*), ONLY THE ATHEMATIC SUFFIX is reflected in Tocharian (cf. Ringe 1996:80-6)

Celtic: the only clearly surviving suffix is OIr. subj. *-a-* (on which see immediately below)

Italic: athematic *-ī-* (in Lat. *velī-*, pf. subj. *-er-ī-*, etc.) ~ *-iē-* (at least in OLat. *siē-*) < PIE *-ih$_1$- ~ *-iéh_1-, but thematic *-ā-* (Trubetzkoy 1926), which is unanalyzable and is matched only by OIr. *-a-* (see above)

the core: athematic *-iéh_1- ~ *-ih$_1$-; thematic *-oy- < *-oyh_1- by regular sound change (see Beekes 1969:238-40 with refs.) < *-o- + *-ih$_1$-

So far as I can determine, Tocharian uses the inherited ATHEMATIC suffix with all types of stems; it REPLACES the thematic vowel of thematic stems. (Its function has expanded to include the imperfect by the same sort of development that Benveniste demonstrated for Middle Iranian in his famous article of 1951.) In the rest of the family we find two different formations. The core languages form the thematic optative in the obvious way: to the o-grade of the thematic vowel they add the zero grade of the optative suffix—in precisely the same way that an active 3rd person plural or participle is formed. Italo-Celtic (IC), however, has appropriated a suffix *-ā- of very unclear origin, which replaces the thematic vowel. The relation between IC *-ā- and 'core' *-oy- has long been a puzzle of IE linguistics, but in the context developed here it seems somewhat less puzzling than formerly: evidently the development of a thematic optative in PIE proper lagged somewhat behind the development of a class of simple thematic presents, so that even within NIE the core languages and IC have innovated differently.

At this point we should ask the obvious question: where do all the simple thematic stems of IE proper come from? It isn't likely that they were all lost in Anatolian; at least some ought to be innovations of PIE proper, and the pattern of attestation suggests that they all are, if we have the right tree, since it looks like their number steadily increased as PIE proper underwent its first 'speciations' into daughter languages. Speculating about the origin of the subjunctive seems hopeless, because we are dealing with the origin of a meaningful category, not merely of its morphological means of expression; let's lay it aside for now. The origin of the thematic aorist was worked out by George Cardona: in almost every case we can show that a thematic aorist arose by thematization of an athematic root-aorist (no doubt beginning in the active 3pl. and participle), and the same explanation can be extended to cover the few remaining examples. Can we account for the thematic presents in the same fashion?

It is certainly true that numerous thematic presents attested in the individual branches can be demonstrated to reflect athematic root-presents of PIH, or PIE, or

various later protolanguages; often enough the old athematic present actually survives in one or more languages. There are dozens of examples; one thinks at once of Gk. λείχει 'licks' ≅ Skt. *réḍhi* < PIE *léyǵʰ-ti, Gk. τρέπει 'turns (it)' ≅ Hitt. *tēripzi* 'plows' < PIE *trép-ti, and so on. This process can easily have begun in PIE proper before it began to diversify, and that could account for some of the simple thematic presents solidly reconstructable for PIE and NIE. But it cannot be the whole story, for several reasons. In the first place, note that those thematic presents of the daughter languages which clearly reflect old athematic presents are recognizable partly by the fact that apparently cognate stems often show different ablaut grades of the root; in fact, that is the only evidence for secondary thematization in a number of instances. For example, nowhere in the family do we find an athematic root-present to *deyḱ- 'point out', yet it is difficult to account for the difference in ablaut between Sanskrit *díśáti* and Latin *dīcit* ('says') unless those two stems are independent thematizations of an ablauting root-present with 3sg. *déyḱ-ti, 3pl. *diḱ-énti. But among the solidly reconstructable simple thematic presents we find no such ablaut differences; except for the anomalous present of 'live' (see fn. 4), they all exhibit full-grade roots. Secondly, it is easy to imagine remodelling an athematic stem into a thematic stem if there is already a class of thematic stems into which to incorporate the new creation, but creating a thematic inflection ex nihilo by thematizing root-presents is a much tougher proposition. So we need to ask: can the few classes of derived thematic presents that are reconstructable for PIH have provided a suitable model for the thematization of athematic root-presents? And as usual the answer isn't clear.

So far I've been arguing inferentially; but in fact there are clear indications in the facts themselves that something else is going on, as Jay Jasanoff pointed out some twenty years ago. Specifically, it does appear that a few unaffixed hi-conjugation verbs of Hittite are cognate with simple thematic presents in PIE proper; the following examples seem reasonably secure (cf. Jasanoff 1979:83-7).

*bʰódʰh₂- ~ *bʰédʰh₂- 'dig' > Hitt. *paddai,* OCS *bodetŭ* ('stab'), Lith. *bẽda;* cf. also Lat. *fodit* 'digs, stabs', with *-ye/o- (but Ennius' *fodentēs* is doubtful (Skutsch 1985:678), whereas OLat. *fodī-* is well attested)

*ḱónk- ~ *ḱénk- 'hang' > Hitt. *gānki,* Goth. *hāhis* 'you suspend (judgment)', Skt. *śáṅkate* 'hesitates' (but does the *-k-* of Skt. *śáṅkate* suggest athematic inflection until the Proto-Indo-Iranian period (Jasanoff 1979:85)?)

*mólh₂- ~ *mélh₂- 'grind' > Hitt. *mallai* (with e-grade root, Melchert 1994:79), OIr. *·meil,* Lat. *molit,* Goth. *maliþ,* Lith. *mãla;* cf. also OCS *meljetŭ,* with *-ye/o-

*nóyH- ~ *néyH- 'turn' > Hitt. *nāi,* Skt. *náyati* 'leads'

*spónd- ~ *spénd- 'pour a libation' > Hitt. *ispānti,* Gk. σπένδει (but Lat. *spondet* 'promises' need not have anything to do with the original root-ablaut; it can easily be what it appears to be, i.e. an intensive *spondéyeti)

Nor is it difficult to find other examples that are at least plausible, for example:

*pót(h₂)- ~ *pét(h₂)- 'fly' > Hitt. *pittai,* Skt. *pátati,* Gk. πέτεται, Lat. *petit* 'seeks'

—but it would be reassuring to find the o-grade in SOME underived category (Gk. iterative ποτᾶται isn't probative, like Lat. *spondet* cited above)

*spórh$_1$- ~ *spérh$_1$- 'kick over' > Hitt. *ispāri,* 3pl. *isparranzi,* 2pl. iptv. *isperten* (Melchert 1994:80-1); also Skt. *sphuráti*?? —but the zero-grade root of Skt. is difficult to account for under this hypothesis; and since a nasal-infixed present is well attested in NIE (Lat. *spernit,* OE inf. *spurnan,* etc.), it seems as likely that the Skt. present somehow reflects thematization of a root-aorist

This is actually the largest group of stem-cognates involving hi-conjugation verbs, including most of the best examples. Other probable stem-cognation classes for hi-verbs are the following.

reduplicated hi-verb = CoreIE reduplicated thematic present (Jasanoff, p.c. 1996): *mi-mn- 'wait' in Hitt. *mimmai* 'refuses', Luvian *mimmandu* 'let them regard' (cf. Melchert 1993 s.v., 1994:81), Gk. μίμνει

hi-verb = NIE present in *-ye/o-: *h$_2$érh$_3$- 'break up' in Hitt. *harrai* 'crushes' (cf. Melchert 1994:79), NIE *h$_2$éryeti 'plows' (with regular loss of the laryngeal) in MidIr. *airid,* Goth. ptc. asg. m. *arjandan,* Lith. *ãria,* OCS *orjetŭ;* reflex of the laryngeal restored analogically in Lat. *arat,* Gk. ἀροῖ

hi-verbs = Tocharian athematic subjunctives: *ay- 'give' in Hitt. *pāi* 'gives', PT *ay(ṣə) > TB *ai-ṃ,* TA *eṣ* 'will give'

*ór- ~ *r̥- 'arrive' (cf. Melchert 1994:81) in Hitt. *āri, aranzi,* PT *ër- (reflecting both ablaut grades, cf. Ringe 1996:67-9, 99-100) in TB *eränträ* 'they are induced (to do good)'? —but the Toch. verb might reflect *h$_3$er- 'rise' (or is that also *or-? cf. Hitt. *arāi* 'rises'; *arta* 'stands' < *értor, Melchert 1994: 137—same root?)

*hi-verb (?) = Toch. root-present: *nós- ~ *nés- 'be safe', reconstructable from *nós- in PT *nësə(ṣə) > TB *nesä-ṃ,* TA *naṣ* 'is', CoreIE *nés-e/o- in Hom. Gk. νεῖται 'returns home', Goth. *ganisiþ* 'is saved'—only THERE IS NO ANATOLIAN COGNATE (hi-verb or otherwise)!

*hi-verb = CoreIE root-perfect: *wóyde 'knows' is the only example, and it has no Anatolian cognates, though the TYPE is very common in Hittite

*reduplicated hi-verb = PIE 'normal' perfect: plenty of NIE exx. (*memóne 'remembers', *tetólh$_2$e 'is holding up', *stestóh$_2$e 'is standing', etc.), and the type must be reconstructed for PIE (proper) to account for the Toch. reduplicated preterite; but in Hitt. only *mēmai* 'speaks' (NOT cognate with *memóne), *wewakta* 'demanded' (with a non-hi-conj. ending; PIH root *weḱ-, but no perfect attested early in any language)[6]

As can be seen, for some of these classes there are no actual stem-cognations at all —only the morphology of the classes suggests a connection between the Hittite stem class and that of PIE proper—and for the remainder there are only one or two respectable stem cognations each, so far as I can now see. To put it as bluntly as possible: though the INFLECTION of the hi-conjugation PRETERITE of Hittite is best matched by the inflection of the PIE perfect, the lexical class of hi-verbs is best

matched by the simple thematic presents of IE proper.[7]

By this point it is clear that verb inflection has undergone massive remodelling in one or both branches of the Indo-Hittite family. More exactly, the pattern of attestation of thematic stems in PIE proper demonstrates extensive remodelling in that half of the family; what is unknown, and may largely be unrecoverable, is the extent to which Anatolian has innovated too.

Most of these individual observations are not new, of course; what is new is the whole picture into which they can now be assembled, using our best computationally derived tree to guide our hypotheses. I am personally surprised and delighted at the way the distribution of forms fits the tree—so it is appropriate to close with a strong cautionary warning.

Let us return to a consideration of the tree itself. As our team has learned by experience, neat branching evolutionary trees are not always what they seem to be in linguistics; in particular, an apparently clean tree can conceal less orderly developments of two types. On the one hand there is always the possibility that the initial diversification of a family was network-like, not tree-like, with neighboring dialects sharing innovations in overlapping patterns according to the famous 'wave model', but that so many of the original dialects died out that the survivors, now separated from one another rather widely in linguistic terms, appear to have 'speciated' by clean splits. For the first-order subgrouping of our family there is no way to tell whether that is what happened; all we know is that our method gave us a remarkably clean cladistic tree (and it need not have done so, as we have emphasized elsewhere). But there is another type of development that our tree might conceal, namely parallel development of the sort termed 'drift' by Edward Sapir, in which related languages appear to develop in the same ways even after they have lost contact with one another. The case of the thematized aorists, whose development belongs largely to the history of the individual daughters, shows that we do have to deal with that phenomenon in IE. There is additional, and much more spectacular, evidence that points in the same direction; we ought to examine it briefly so as to form some idea of the scope of the problem.

The most widely accepted reconstruction of the PIE verb system accepts that a verb could have from one to three basic stems, which marked aspect; the system can be outlined and exemplified as follows.

STEM	FUNCTION
present	imperfective aspect (some statives included)
aorist	perfective aspect
perfect	stative

pres. *stí-steh$_2$-ti 'is (in the process of) standing up', aor. *stéh$_2$-t 'stood up', perf. *ste-stóh$_2$-e 'is in a standing position'

pres. *déyḱ-ti 'is pointing out', aor. *dḗyḱ-s-t 'pointed out'

aor. *h$_2$neḱ-t 'reached', perf. *h$_2$e-h$_2$nónḱ-e 'is at'

pres. *h$_1$éy-ti 'is going' (no other stems)

aor. *h$_1$lud^{h}é-d 'arrived' (no other stems)

perf. *wóyd-e 'knows' (no other stems)

Such a system is clearly reconstructable not only for the core, but also for NIE, since Latin preserves substantial relics of a purely aspectual use of the perfect stem (the s-formations of Old Latin, the use of *velle* in the *Senatus Consultum de Bacchanalibus* and in legal Latin generally, *nē* + perf. subjunctive in prohibitions, the double sequence of tenses following the 'perfect'). Even the Tocharian system can be explained as a development of this traditional construct: it is abundantly clear that the Tocharian preterite reflects the morphological merger of the inherited aorist and perfect, and it seems increasingly likely that the subjunctive stem (with its appendage, the imperative) partly reflects old modal forms and partly old presents, including hi-conjugation presents. But the Anatolian system is obviously very different. Each Anatolian verbal lexeme has a single stem, which can correspond in formation to any of the types of stems attested in IE proper; all relations between stems are derivational, not inflectional. It would seem that we have a fundamental split between the two halves of the family, and that either Anatolian has lost the rich inherited inflectional system (the hypothesis of Cowgill and Rix), or else the aspect-based system was an innovation of PIE proper before it had begun to diversify.

However, this neat picture falls apart when we look more closely at the facts of Greek. It is Greek that seems to preserve the inherited aspect system best of all the attested languages; yet it is also in Greek that we find the clearest cases of interchange between present and aorist stems—especially presents that reflect inherited aorist subjunctives, but also an entire class of aorists that reflects an inherited present class. The most striking examples are the following.

Present stems that can only reflect inherited aorist subjunctives:

- λείπει 'leaves (it)', replacing inherited *li-né-k^{w}-ti (Skt. *riṇákti;* Lat. *linquit,* thematized); source is aor. subj. *léyk^{w}-e-ti, cf. indic. *léyk^{w}-t, 3pl. *lik^{w}-énd (Lat. *līquit;* Gk. ἔλιπε, thematized)
- φεύγει 'runs away (from)', replacing inherited *b^{h}ug-yé-ti (Lat. *fugit,* 3pl. *fugiunt*); source is aor. subj. *b^{h}éwg-e-ti, cf. indic. *b^{h}éwg-d, 3pl. *b^{h}ug-énd (Lat. *fūgit;* Gk. ἔφυγε, thematized)
- δέρκεται 'sees, looks'; source is aor. subj. *dérḱ-e-ti, cf. indic. 3pl. *dṛḱ-énd (Skt. *ádṛśran;* Gk. ἔδρακον, thematized; apparently no pres. in PIE)
- φείδεται 'spares' ← *'marks off a share for him/herself' ← *'splits for him/herself', replacing inherited (act.) *b^{h}i-né-d-ti (*[b^{h}inétsti]) 'splits' (Skt. *bhinátti;* Lat. *findit,* thematized); source is aor. subj. *b^{h}éyd-e-ti, cf. indic. *b^{h}éyd-d (*[b^{h}éyd^{z}d]; Skt. *ábhet*)

Zero-grade thematic aorists made to inherited thematic presents on the model of the preceding type:

- Hom. ἐπι-σπεῖν 'to wield', made to pres. ἐφ-έπει 'wields', thematized from PIE *sépti (Gathic Avestan *haptī* 'serves, holds')
- ἐτράπετο 'turned', made to pres. τρέπει 'turns (it)', thematized from PIE *trépti (see above)
- ἔπτετο 'flew', made to pres. πέτεται 'flies' (?; see above)

ἕσπετο 'followed' (inf. σπέσθαι), made to pres. ἕπεται 'is accompanying' (see above)

ἐπίθετο 'was persuaded', made to pres. πείθεται 'obeys' (see above)

ἔσχε 'got', made to pres. ἔχει 'has' (cf. Skt. *sáhate* 'prevails')

ἀπ-έπαρδε 'farted', made to pres. πέρδεται 'is farting' (cf. Skt. *párdate*)

Homeric and Classical Gk. passive aorists in -η-, -θη- ← INTRANSTIVE aor. in -η- with zero-grade roots, e.g. (Hom.):

ἐμίγη 'got mixed (up), had sex (with)', cf. trans. μεῖξαι 'to mix'

ἐπάγη 'it stiffened', cf. trans. πῆξαι 'to fix (something in something else)'

The only possible PIH etymon for this last type is the STATIVE PRESENT suffix *-éh$_1$-: also intransitive, also non-ablauting, also with zero-grade roots (see especially Watkins 1971, Jasanoff 1988:16-9, 24-9).

It is difficult to imagine how such interchanges could have occurred in a system based so solidly on aspect, yet it is clear that they did occur. Note further that, though the development of aorist subjunctives into present indicatives is also attested in Germanic (as Karl Hoffmann pointed out more than forty years ago), the two cases are not similar at all. Not only has Germanic abandoned any system of aspect and lost the aorist indicative in any function, it has also merged ALL subjunctives functionally with the present indicative; that is why the so-called first person plural imperative in Germanic is identical with the corresponding indicative form, and it is at least one reason why the present indicative can be used to express future time. Under those conditions it is not at all surprising that some aorist subjunctives might surface as present indicatives. But in Greek the system of moods is just as much alive as the system of aspect; indeed, both still survive in Modern Greek. So we need a completely different explanation for these Greek puzzles.

So far as I can see, there is only one way to account for the Greek facts: these interchanges between presents and aorists must have occurred while the relation between present and aorist stems was much looser—specifically, at a time when presents and aorists were NOT part of the same fixed paradigm. In other words, they must have occurred when the organization of the system was more like it is in attested Hittite. And the actual examples tell us something further. Take another look at the first example listed on the preceding page. Latin, which is outside the core, and Sanskrit, which is inside, agree in showing a nasal-infixed present for 'leave'; that is therefore the form that the innovative Greek present must have replaced. (As is well known, the 'double-nasal' presents of Greek—the type λαμβάνειν 'take'—are completely unconnected with the nasal-infixed presents of the other languages; Greek eliminated the inherited type at some point in its prehistory.) And if our tree is the true tree, the replacement of a nasal-infixed present by an aorist subjunctive must have occurred at the earliest during the separate development of Greco-Armenian (see fig. 2).[8] It follows that the organization of the verb resembled that of Hittite at least up to the point at which the protolanguage of the core began to diversify; and it follows further that the aspect system which is so solidly entrenched in Greco-Armenian and so easily reconstructable for Latin and

the satem languages must have become paradigmatic independently at least three times: once in the immediate ancestor of Italo-Celtic, once in that of Greco-Armenian, and once in that of the Germanic-satem complex.[9]

So there has been a great deal of parallel development in the organization of the verb system within NIE; clearly it would NOT be correct to continue reconstructing the 'Brugmann' verb (or the Cowgill-Rix verb) even for the protolanguage of the core. Strictly speaking this could have been seen a century or more ago, because the Greek facts have been known from the start. What throws those facts into relief, and adds a further argument that we should reconsider, is the new tree—and I think that is the most important consequence of our new proposal for the subgrouping of Indo-European.

Notes

[1] The distribution of thematized aorists was an input item for our tree-construction program, because it is already well understood; thus it is not a 'consequence' of our hypothesis, but part of the data on which the hypothesis is built. The other distributions discussed in this paper ARE genuine consequences of the hypothesis. (We did include the thematic optative in our database, but we originally evaluated it differently; the analysis reported here was arrived at only after we had the tree.)

[2] The etymological sources of the Tocharian subjunctive are too varied and problematic to be discussed here; note, for example, that many do not end in the thematic vowel and so cannot be etymologically identical with any subjunctive in any of the more familiar languages.

[3] The forms of this Latin stem with no stem vowel are almost certainly syncopated rather than originally athematic; note that the subjunctive is *ferā-* (never *'ferī-'*), that the Umbrian future is (3sg.) *ferest,* etc.

[4] As Jay Jasanoff reminds me, this stem is structurally anomalous; apparently it was created by inflecting the derived adjective *$g^{w}ih_3$-wó-s 'alive' (Lat. *vīvos,* Skt. *jīvás,* etc.) as a verb. There are no good parallels.

[5] This class of Tocharian subjunctives will be discussed fully in a paper in progress.

[6] Note that the apparent parallel between Hitt. *wāki* 'bites' < *wóh$_2$g-e-i and Gk. ἔᾱγε 'it's broken' < *we-wāg- ← *we-wóh$_2$g- (cf. Kimball 1988:243, 245) is an illusion, as the wide difference in meaning demonstrates.

[7] Other possible stem cognations are less exact. For example, we find *spóh$_1$i- ~ *sph$_1$i- in Hitt. *ispāi* 'eats his/her fill', 3pl. *ispiyanzi;* but while CoreIE *spéh$_1$yeti 'gets fat' (Skt. *sphāyate,* OCS *spějetŭ* 'succeeds', etc.) has the same root-extension, its root shows the one ablaut grade that does not appear in the Hitt. paradigm. Does it appear in OE *spōwan* 'to succeed'? If so, has an intervocalic *-j- been lost, as per Þórhallsdóttir's recent Cornell dissertation? In that case, is the Hittite zero grade an innovation, so that we should reconstruct PIH *spóh$_1$i- ~ *spéh$_1$i-? And this is the BEST of the doubtful cases. — As is well known, a possible further piece of evidence for a connection between the hi-conjugation and PIE (proper) thematic stems is the fact that in the latter the 1sg. active 1ary ending is not *-o-mi, as expected, but *-o-h$_2$. Of course the identity of the laryngeal is only a matter of (reasonable) inference, but there clearly WAS some syllable-final laryngeal; otherwise we would not find, e.g., Lith. *degù* 'I burn (it)' < *degúo < *degṓ < *dègṓ (where ` marks the position of the accent, and ´ marks acute intonation) < *$d^{h}ég^{wh}oh_2$. The ending is reconstructable for PIE (proper) because Tocharian B *-u* is an almost certain reflex (Ringe 1996:89-90 with references). But why do we not find the 1ary ending *-h$_2$e-i (or *-h$_2$-i, if that's what it would be in this context)? To that extent the ending is like that of the PIE (proper) perfect, and not like that of the Hitt. hi-conjugation.

[8] The Armenian nasal-SUFFIXED present *lk^{h}anê* has obviously been formed to the aorist *elik^{h}* and therefore tells us nothing useful about the inherited stem.

[9] Even that is perhaps not the full story. Melchert (forthcoming) makes a strong case for the hypothesis that aspect PARADIGMS existed also in Proto-Anatolian. Since in my view the Greek facts make the reconstruction of such paradigms for PIH impossible, I must reckon with a fourth example of the same parallel development if Melchert is correct.

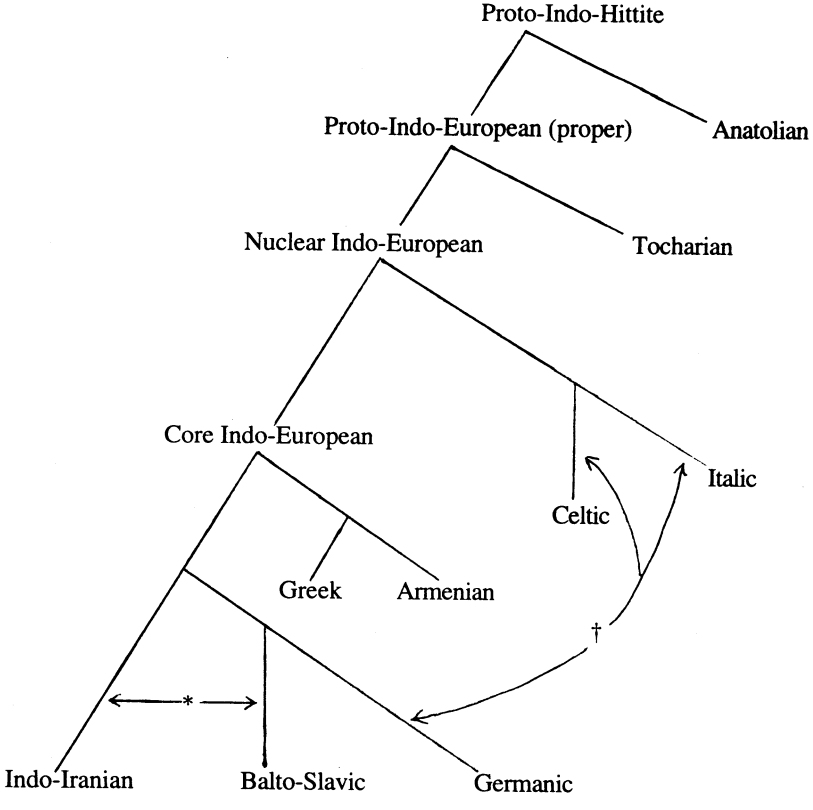

Fig. 1. The current best tree of Warnow, Taylor, and Ringe.

* Intense contact between divergent dialects, resulting in the borrowing of the satem sound changes (and probably lexical material).

† Less intense contact, probably between already different languages, leading to much lexical borrowing *before* diagnostic sound changes in any of these branches.

Note that Albanian cannot be placed precisely. It is clearly a member of IE proper, and clearly not a member of any of the smaller well-defined subgroups (Italo-Celtic, Greco-Armenian, or the Germanic-satem complex), but that is all that can be said.

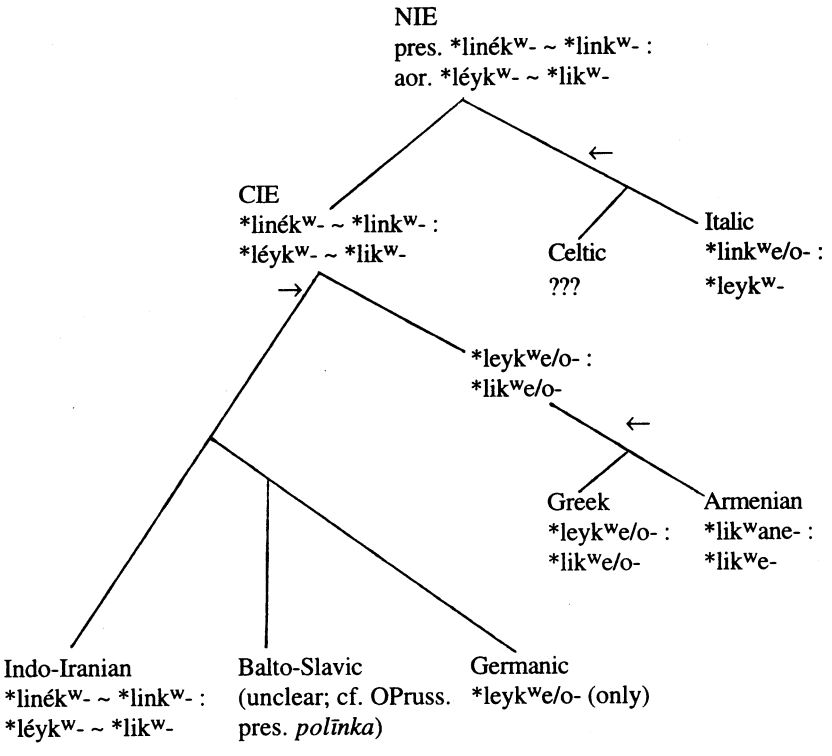

Fig. 2. The development of the present and aorist of *leykʷ- 'leave'.
The arrows mark the earliest points at which the relation between the stems can have become strictly paradigmatic in the prehistories of the attested languages.

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