

THE 'WHATS' AND 'WHYS' OF THE GLOTTALIC THEORY

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Introduction

The focus of the present paper is the relatively new hotbed of controversy within Indo-European studies known as the 'Glottalic Theory'. This theory proposes a completely revised look for the Proto-Indo-European obstruent system which has consequently received polaric responses ranging from total respect to caustic rejection, both extremes being based at least in part on grounds of typology. This paper will look first at the traditional reconstructions to find out what prompted the proposed changes. Next the term 'glottalic' will be addressed in §2. Once it has been made clear what exactly is meant by 'glottalic', §3 will examine arguments against the new theory and §4 and will look at responses to those arguments. Finally, §5 reviews those works which have applied the new theory to some of the 'old' laws of Indo-European such as Grimm's Law, Grassmann's Law and Lachmann's Law among others.

1. On What Grounds?: problems with the traditional view

This section addresses the question of why changes for the traditional system were initially proposed. The first issue looked at is that often referred to as the '/b/-gap'. Next the status of the traditionally held voiced aspirate series is examined in light of markedness theory and implicational universals. Thirdly motivation for root structure constraints is called into question for the traditional obstruent system. The final issue addressed and that most central to the Glottalic Theory is the question of typological plausibility.

1.1 '/b/ - Gap'

Gamkrelidze (1976) among others argues that the relative absence of the phoneme /b/ in Indo-European is troublesome. This is due in part to cross-linguistic tendencies which illustrate a preference for the labial position to be filled in the voiced plosive series. According to Maddieson (1984), of the 221 languages listed with at least one voiced plosive, 212 of those contain labial segments. Considering, for the sake of simplicity, only the three segments /b, d, g/, the following are the findings from Maddieson:

(1)	<u>segments</u>		<u># of languages¹</u>
	/b, d, g/	-	192
	/b, d/	-	16
	/b, g/	-	4
	/b/	-	7
	/d, g/	-	2
	/d/	-	4
	/g/	-	3

From the above information alone, it becomes clear that the labial position is the unmarked member of a voiced plosive series. Furthermore, when looking at voiced implosives, only 2 of the 31 systems listed in Maddieson with this series have a gap in the labial position. Again considering only /b, d, g/, the following emerges from the Maddieson data:

(2)	<u>segments</u>		<u># of languages²</u>
	/b, d, g/	-	8
	/b, d/	-	19
	/b, g/	-	0
	/b/	-	2
	/d, g/	-	0
	/d/	-	2
	/g/	-	0

Not only is it clear that a labial gap here is marked, it also becomes apparent that a velar gap is not as /g/ in the absence of either of the other two segments does not occur. Alternately in the voiceless series the opposite is the case: labials are marked and velars are less so. This is demonstrated in (3) and later in §2.1.

¹ /d, g/ (Mixe, Wapishana); /d/ (Cashinahua, Diyari, Gadsup, Sentani); /g/ (Mazahua, Rotokas).

² /b/ (Kpelle, Zulu); /d/ (Berta, Kullo)

(3)	<u>segments</u>		<u># of languages</u> ³
	/p, t, k/	-	266
	/p, t/	-	5 ⁴
	/p, k/	-	1
	/p/	-	0
	/t, k/	-	27
	/t/	-	1
	/k/	-	0

Although, the traditional view of the PIE voiced obstruents includes the phoneme /b/, its occurrence in lexical reconstructions is quite rare. Lass (1984: 132-133) illustrates the contradiction of this situation: marked elements show lower frequency and are cross-linguistically less common. Upon consideration of the above data, one sees the problem with the traditionally held view: If /b/ is cross-linguistically very strongly attested (96% of the voiced plosive series listed in Maddieson), why is it such a rare segment lexically in PIE? This is one question addressed by the Glottalic Theory.

1.2 Voiced Aspirates

The next problematic area concerns the traditionally held voiced aspirate series (D^h). Early work on Indo-European posited an obstruent system which contained a four-way contrast as follows:

(4)	<u>Series I</u>	<u>Series II</u>	<u>Series III</u>	<u>Series IV</u>
	Early Work:			
	b, d, g	b ^h , d ^h , g ^h	p, t, k	p ^h , t ^h , k ^h
	Later Work:			
	b, d, g	b ^h , d ^h , g ^h	p, t, k	_____

³ /p, k/ (Hawaiian); /t/ (Kewa: /t, c/)

⁴ It should be noted that this number is somewhat misleading in that 3 of the five languages (Tagalog, Tzeltal, and Zuni) are listed with glottal stops and one other (Kirghiz) contains the uvular stop /q/. Only one language (Beembe) is listed as having only labial and alveolar stops in the voiceless series. Therefore just two of the 300 languages listed with voiceless plosives are marked in this series.

Later (c.f. the Laryngeal Theory) it was seen as unwarranted to include series IV (T^h) as will be discussed in §3.4. Without the T^h series, however, the traditional system violated even more typological and markedness constraints.

Regarding the typology of a system including D^h, one would also expect T^h by virtue of implicational universals.(Hock, 1988:621) Markedness theory would require the D series to be more frequent and have more freedom in root position than the more marked D^h. However as demonstrated in §1.3 reconstructions of PIE show the opposite to be the case.

Furthermore, there had arisen a desire for a precise definition of the phonetics of the D^h series. If one considers the VOT continuum, the idea of a voiced aspirate series as an oxymoron begins to become apparent. Aspiration requires an open glottis and voicing a closed glottis. Reconciling the two seems then to be quite dubious if not linguistically impossible.

1.3 Root Structure Constraints

Positing plausible motivation for the root structure constraints of PIE within the traditional view was always problematic. These constraints are shown in (5):

(5)	TVD	DVT	TVT
	DVD ^h	D ^h VD	D ^h VD ^h
	*DVD	*TVD ^h	*D ^h VT

What possible interpretation could there be for such constraints on root structure? All explanations tend to be ad hoc and have little to do with naturalness of language. The combination of two plain voiced segments within a CVC root is quite basic cross-linguistically and its ban in PIE is difficult to understand. A voicing dissimilation rule (in and of itself problematic) cannot explain the situation as other roots are allowed with the same value for voice on both consonants. The phonotactic constraint of T combined with D^h can not be explained on articulatory or markedness grounds.

As alluded to in the previous subsection, the problem of distribution and frequency of occurrence emerges here as well. It is unclear why an extremely marked segment such as D^h should be allowed to occur twice in a root, but the less marked D should not. Furthermore, the latter should have more lexical frequency than the former, but according to Lass (1984:132-133) it does not. Voiced aspirates occur with more frequency lexically as well as in inflectional morphology.

1.4 Typology

The issue of typology is a major focus of the Glottalic Theory. How typologically sound is it to posit a system such as the one in (6), a system which utilizes all of the highly marked constraints mentioned in the previous subsections? This is the question put forth by many supporters of the Glottalic Theory.

(6) D D^h T

Ultimately, justification must be given for positing a system as marked as the one above. The troublesome aspect of this system is not that it is marked in some way, but that it is marked in so many ways. To recap the previous discussions, a system containing two voiced series and only one voiceless is questionable. Secondly, positing a D^h series without a T^h series is dubious. A third consideration is the phonetic plausibility of the D^h series: is it physiologically probable to posit such a sound? What motivation is there for the rather unnatural (for the traditional system!) root structure constraints in PIE? Finally, the low frequency of the phoneme /b/ and the low frequency of the D series in contrast to the D^h series word initially and in affixes forces one to reevaluate the validity of the traditional system. All of these problems together plus the fact that the traditional system is not attested in any known language, make for pretty shaky ground for the system to stand on.

Summary

This section has illustrated that the traditional reconstruction of the PIE obstruent system is severely faulty. Not only is the labial gap in the voiced series disconcerting for markedness theory, the elimination of the T^h series left an even more typologically implausible system than was already apparent from the point of view of markedness. This typological implausibility will be more fully addressed in §4. Furthermore, PIE root structure constraints cannot be satisfactorily explained under the traditional reconstruction.

As demonstrated above and further explicated in §4, a system such as that in (6) cannot be seen as likely in human language. Therefore a new 'glottalic' theory of the PIE obstruent system has been presented. The next section deals with the changes this new theory proposes

2. What IS the Glottalic Theory Anyway?

In the literature, even among those in favor of the Glottalic Theory, there is no clear consensus on what the 'glottalic' in that theory actually means. This section attempts to make sense of the many views and illustrates my own personal preferences within each series. Arguments for (and against) different theories about the phonetic quality of all three series are examined. First the basic idea of the Glottalic Theory is discussed. Next the conflicts concerning

the glottalic value of Series I are presented. The third issue addressed is that of Series II which ultimately affects ideas of the value of Series III. Therefore both series will be discussed in the same section.

2.1 The Basic Changes

Due to the marked quality of Series I, it was seen as expedient to posit a series with a cross-linguistically marked phonetic value. Of course this series must be able to support attested developments in daughter languages. With this in mind it has been argued that this series had a glottalic value, typically viewed more precisely as an ejective series (T'). This assumption is based on the fact that voiceless plosives demonstrate a tendency not to be represented in the labial position. Or rather, when there is a gap in the series, cross-linguistically the labial tends to be the omitted segment as demonstrated in (7), repeated from (3) for convenience.

(7)	<u>segments</u>		<u># of languages</u>
	/p, t, k/	-	266
	/p, t/	-	5
	/p, k/	-	1
	/p/	-	0
	/t, k/	-	27
	/t/	-	1
	/k/	-	0

Voiceless plosives are, however, *unmarked*. Although the /b/ -gap could be explained with a T series, the marked quality of the series as a whole could not. A relatively marked voiceless plosive which demonstrates the tendencies just discussed is the ejective. The reasoning for positing T' for Series I, then, becomes clear.

Series II would need to be phonetically less marked than the traditional D^h would indicate. Furthermore the change of Series I to a 'glottalic' series left open the possibility of one of the other two series being seen as plain voiced. Because Series III was considered by nearly everyone as plain voiceless (T), it was a rather natural step to see Series II then as plain voiced (D).

Given the above scenario, the newly evaluated PIE obstruent system would be as follows:

(8)	<u>Traditional View</u>		<u>Glottalic Theory</u>
	D	>	T'
	D ^h	>	D
	T	>	T

2.2 Series I

There are at least two opposed views of the glottalic value of this series: proponents of ejectives and proponents of implosives. Gamkrelidze and Ivanov, Hopper, and Vennemann to name a few find the ejective analysis more satisfying. However, Haider believes implosives would better explain the later developments. Still further, Salmons proposes that both ejectives and implosives can be supported.

The argument behind the T' proposal is the glaring gap in labial position. As discussed above, this argument seems to be a rather solid one considering the typological tendencies of ejectives and the characteristics of Series I in PIE. For supporters of the T' series, T' > D is an unproblematic sound change.

Yet, this is also part of the argument for the voiced implosive (D[̣]) proposal.⁵ Proponents of this series reason that the labial gap can be accounted for just as well with an implosive series as with an ejective series. Apparently labial implosives tend to become /m/ cross-linguistically. The high frequency of /m/ in PIE reconstructions lends support for the implosive hypothesis. Furthermore, it is argued that the D[̣] series would better account for developments in daughter languages in which this series became D. For this camp the move from T' > D is problematic, whereas D[̣] > D is not.

A third point of view is that which embraces both ejectives and implosives in arguing for the value of Series I. Salmons regards the PIE series to have included ejective and implosive allophonic variation. It is assumed that this line of reasoning would call for a feature [+glottalic] for PIE Series I and allow for bifurcation of the glottalic value in the individual daughter languages. Salmons sees this bifurcation as resulting in ejectives in Germanic and implosives in the classical IE languages.

'Bifurcation' is the most satisfying of these three arguments. Whatever the actual glottalic value -- ejective or implosive -- retained in each of the daughter languages, allophonic variation makes for tidy explanation of the diachronic facts of IE. Further, allophonic variation between these values is not only attested in languages of the world but also adds elegance to a previously somewhat clumsy theory of the most investigated obstruent system in Historical Linguistics.

2.3 Series II and III

Less clear is the phonetic value of Series II. Hopper defines the series as either breathy-voiced or murmured stops or perhaps voiced fricatives. Gamkrelidze and Ivanov see the series as plain voiced with allophonic aspiration. Vennemann posits unaspirated lenis stops and Salmons suggests a voiceless aspirated series. Other positions hold plain voiced stops, implosives or non-allophonic aspirated voiced stops. Only the first four of these arguments will be dealt with here.

Hopper's view of the series as breathy or murmured is difficult to take seriously given the large number of examples in PIE of labiovelars traditionally reconstructed as aspirated (g^{wh}).

⁵ For lack of a better symbol to represent the voiced implosive series, D[̣] will be used. It is hoped that no confusion is caused by this choice of diacritic.

Although labiovelars are not unusual, aspirated labiovelars are more marked. In fact, Maddieson includes only 14 such segments in his list of 317 inventories. Furthermore, only one example of a breathy *voiced* labiovelar is cited (Igbo). A total of 88 labiovelar segments were found. These can be broken down as in (9):

(9)	<u>Segment</u>	<u>Occurrences</u>
	k ^w	38
	k ^w h	14
	k ^w '	17
	g ^w	14
	θg ^w	4
	g ^w 6	1

The above data suggest strongly that Series II could not have been voiced with any aspiration-like quality. Gamkrelidze and Ivanov's allophonic variation of aspiration is no more convincing than the argument just discussed. Therefore the only arguments left to consider are those involving a plain voiced series or a voiceless aspirated series.

Vennemann's D series works well typologically as Maddieson lists 13 languages with the system T' D T. Although not one of the most attested systems of the world's languages, it is nevertheless clearly a plausible option regarding typology. Sound changes D > D for Germanic are obviously unproblematic. What is not as satisfactory for this proposal are sound changes required to yield the classical languages. This is demonstrated in (10).

(10)	<u>Language</u>	<u>Sound Change</u>
	Germanic	D > D
	Greek	D > T ^h
	Latin	D > θ
	Sanskrit	D > D ^h

Salmons proposal involving a voiceless aspirated series also is somewhat unsatisfactory. Although Greek and Latin can be developed quite neatly with this view, Sanskrit and now Germanic become troublesome. Again, the necessary changes are shown below.

⁶ For lack of the appropriate diacritic for breathy voice, the 'w' mark is used here. It should also be noted that there were no true aspirated voiced labiovelars found. Apologies for any confusion.

(11)	<u>Language</u>	<u>Sound Change</u>
	Greek	T ^h > T ^h
	Latin	T ^h > θ
	Germanic	T ^h > D
	Sanskrit	T ^h > D ^h

The consequence of this indecisive situation is that it becomes difficult to establish the phonetic quality of Series III. If Vennemann is correct and Series II is plain voiced, then Series III is free to either be plain voiceless or voiceless aspirated. Vennemann chooses to see the latter as more preferable. However if Salmons is correct, Series III can only be interpreted as plain voiceless, which is exactly what he determines it to be. To sum up, the following three scenarios are possible for PIE where 'G' stands for an undetermined value of glottalicness:

(12)	<u>Scenario 1</u>	<u>Scenario 2</u>	<u>Scenario 3</u>
	G D T ^h	G D T	G T ^h T

As is evident in (12), the second stop series of PIE remains a mystery. Further extensive study is necessary before any real determination of the phonetic value of the series can be made. However, (allophonic) aspiration seems more likely in that it allows more natural development of Series III into the daughter languages. In other words, the possibility of (allophonic) aspiration in Series III accounts for T in the classical languages as well as θ in Germanic.

Summary

In this section the core arguments of the Glottalic Theory have been discussed. It is evident that there is growing support for a glottalic value for Series I, yet the precise value is under dispute. Arguments for ejectives versus implosives have been given and both show strong credibility. It has been shown however, that perhaps both sides are correct and that PIE contained ejectives and implosives in allophonic variation. Series II remains problematic as neither of the two most popular arguments can satisfactorily motivate all of the sound changes required to yield the daughter languages. Due to indecision in the second series, it is impossible to say without a doubt what the value of Series III should be.

3. Arguments Against the Glottalic Theory

Responses since the first utterances of the Glottalic Theory have often been quite vehemently opposed to the proposed changes. Unfortunately some of the objections were of a

'less-than-scientific-tenor' (Salmons, 1993:22) and many others seemed to imply assumptions on the part of the 'pro' Glottalic Theory camp which were simply without basis. However, 'anti' Glottalic Theory arguments in a sober and scientific tone are available. Both types are discussed here according to the focus of the argument. It seems the most problematic aspect of the Glottalic Theory to those opposed to it is the issue of typology. However various other objections involving among others the absence of /b/, Series II and resurrecting the original four-way contrast are discussed in the literature and so are mentioned here.

3.1 Typology

The question raised by many against the glottalic theory is the role typology should play in reconstructing a proto-language. Back and Dunkel for instance reject the role of typology altogether. Szemerényi, however uses it indirectly to argue against the theory.

Back argues that typology is of no use to reconstruction because as he claims it is based solely on statistics. Although not the rather unscientific tone alluded to earlier, Back (1979) is quite harsh in his statement that the Glottalic Theory turns 'reconstruction into a game and a matter of taste' (Salmons 1993). He also compares the elimination of the originally held fourth series (T^h) with the elimination of the phoneme /b/. However, as Salmons points out, the Glottalic Theory does not set out to eliminate the phoneme from the inventory of PIE, but rather it attempts to find a satisfactory explanation for its unusual rarity.

Both Back and Szemerényi 'solve' the typological problem of the system by reinstating the formerly eliminated fourth series T^h . This will be discussed in §3.3. However, both agree that the traditional three-way contrast was problematic. The two differ in that Szemerényi concedes that there were typological problems with the system $D D^h T$.

Dunkel is the harshest critic of the Glottalic Theory. He objects vehemently to the use of typology in reconstruction and criticizes Szemerényi for admitting it into his argumentation. However, as Salmons makes clear, Dunkel defines typology in a markedly different way than those linguists working under the premise of the Glottalic Theory.

Because typological claims are not unwavering universals Dunkel sees them as ineffectual in making claims about proto-languages. Dunkel's main premise it seems is that 'we can never be sure that yesterday was not the last day in the life of the last speaker of a clearly univocalic language', for example, and therefore 'simple humility demands that we admit that no final assertion of the impossibility of any linguistic feature will ever be feasible'. (Dunkel 1981:564)

A second reason Dunkel gives for rejecting 'reconstruction modified to conform to typological opinion' (Dunkel 1981:562) is as follows: The Glottalic Theory uses typology to predict what is probable and what is not. Typology cannot, though, be used to predict anything until all available languages have been studied. 'But once every available human language has been studied, what need will there be of prediction? All "universals" will be descriptive facts.' (Dunkel 1981:565)

3.2 Absence of /b/

All opponents of the Glottalic Theory have had something to say about the lack of /b/ in traditional reconstructions of PIE. Most assume that this phoneme was eliminated altogether, which is not the case. Secondly, many opponents use comparative evidence to argue that a gap in this position is attested in languages of the world.

Szemerényi sees the /b/ - gap as the central issue of the Glottalic Theory. He argues against the glottalic series seeing ejectives as an areal feature incompatible with diachronic evidence from Indo-European. He offers two IE languages with ejectives (Eastern Armenian and Ossetic) but rejects them as evidence for the Glottalic Theory citing the fact that they both lie in the Caucasus and claiming that they therefore must have been influenced by the indigenous languages of the region.⁷ Although Szemerényi acknowledges that /b/ is rare in initial position, he argues for its acceptance as a well-grounded phoneme on the basis of its 'clear existence in medial position' (Salmons 1993: 19). This evidence, he claims completely invalidates the typological argument. This issue will be addressed below in §4.

Dunkel is one of those opponents claiming that the Glottalic Theory assumes the absolute absence of /b/ in the traditional system. He states however that regardless of the rarity or absence of the segment within the theory, 'all this work must be rejected without ado'. (Dunkel 1981: 567) His assumption is that one occurrence of a phoneme in the lexicon is enough to validate its unquestioned position within an inventory: the phoneme /b/ 'did occur often enough; certainly more often than the necessary once'. (Dunkel 1981: 567)

3.3 Series II

Szemerényi's objection to the changes proposed for the voiced aspirates is based on assessing the possibility of articulating such sounds. As mentioned in §1.2, the claim is not that these segments would have been *impossible* to articulate, but rather that they would have been *improbable* given their extremely marked character. The appearance of these segments without voiceless counterparts is also a point of contention for the Glottalic Theory as discussed above. Yet due to evidence of exactly this situation from Kelabit Szemerényi finds the situation in PIE a moot point.

3.4 Szemerényi's 4-way Contrast

Szemerényi is not the only opponent of the Glottalic Theory to propose a return to the four-way contrast of yore. Others like Back also support this move suggesting that the elimination of the fourth series was premature and without solid foundation. However, the extensive work dedicated to the Laryngeal Theory, which was the impetus for erasing the voiceless

⁷ 'Die zwei idg Sprachen sind zweifellos von den kaukasischen beeinflusst worden.' (Szemerényi 1990: 161)

aspirates from the system by reinterpreting T as T + H⁸, has all but eliminated any justifiable opposition to the move and thus voided arguments for returning to the old system.

Summary

As seen in this section, there are varying viewpoints in objecting to the Glottalic Theory. However, the only real objection is that of typology as all other objections but the elimination of the fourth series are ultimately tied in with typology. Whether /b/ is attested or not is not the issue, but rather the matter to be resolved is its status as a more limited phoneme in contrast to the other phonemes in its series and, most strikingly, in contrast to the highly marked series of voiced aspirates. Furthermore, whether it is possible to articulate a voiced aspirate should not be the focus of argumentation. Instead, discussions should concentrate on the more core question of the linguistic plausibility of such a segment. Finally, although not discussed here, the Laryngeal Theory sufficiently resolves the issue of the elimination of the voiceless aspirate series.⁹

4. Responses to Anti-Glottalic Theory Views

Although some of the 'minor' objections to the Glottalic Theory were addressed straight away in the previous section, the question of the role of typology in reconstruction is given further focus here.

In the previous section arguments were given against the Glottalic Theory, many of which were at least in part based on the issue of typology. Some very extreme arguments suggested that typology should be allowed no role in reconstruction. Yet these arguments are based on the faulty assumptions that 1) typology is incomplete and therefore void of defensible facts and 2) the Glottalic Theory is based on extremist views which disallow any marked characteristics to appear in reconstructions. Both of these assumptions are completely unfounded.

Simply because some languages have perished before information about them could be recorded and some still living languages have yet to be studied or even discovered does not preclude the linguistic evidence gathered to date from being used to make inferences about language patterns and tendencies. Dunkel et al. would deny linguistic science this valuable tool in reconstruction. There is a grain of truth in the argument that the non-existence of evidence of a feature, segment, system, etc. cannot be perceived as equal to the impossibility of the existence of that feature, segment or system. In other words that we have not found 'x' does not mean we will never find 'x'. Yet exactly this lack of evidence should prevent its inclusion in reconstructions.

In the entire data-bank comprising Maddieson's (1984) study, there is not a single attestation of a D^h segment, let alone such a series. When taking into consideration, the phonetic

⁸ Here H represents an original PIE laryngeal. This laryngeal, according to the theory, has been retained in some dialects and lost in others: Ger. *mehen*, *sehen* vs. Engl. *to mow*, *to see*. The three different laryngeals proposed for PIE would also account for (e ~ o ~ ø) vowel quality differences within IE verbal paradigms

⁹ The reader is referred to Lindeman (1987) for further discussion of the Laryngeal Theory.

alternative proposed by some, namely breathy voice, the evidence is still unconvincing. Those systems with breathy voiced segments consistently contain voiceless counterparts as is shown in (13) below.

(13)	<u>System</u> ¹⁰	<u>Languages</u>
	T T ^h D D ⁻	5
	T T ^h D D ⁻ T [~] D [~]	1
	T T ^h D D ⁻ T' D'	1
	T T ⁻	1
	T T ^h T ⁻	1

The above chart shows that languages with breathy voiced stops consistently adhere to symmetry constraints along a voiced/voiceless axis: T \supset D, T^h \supset D⁻, T[~] \supset D[~], and T' \supset D'. This is further evidence that Series II was other than aspirated or breathy.

As argued in §2, each of the three series in the traditional framework violates certain cross-linguistic tendencies. Arguments have been made that attested languages also violate these tendencies. The rarity of languages which do violate one or the other of these constraints aside, no one language has to date been found which violates all of the constraints which would have to be assumed for the traditional reconstruction. This is a heavy load to bear for a reconstructed language. Finding proof of a language system which ignores several powerful tendencies would be something completely different from reconstructing such a system.

Furthermore, the fact that the system assumed under the Glottalic Theory is well attested is not the only convincing argument for the theory. Those languages which have this system also display the markedness considerations previously unexplainable by the traditional system: (labial-gap), lexical infrequency and root structure constraints of ejectives and implosives

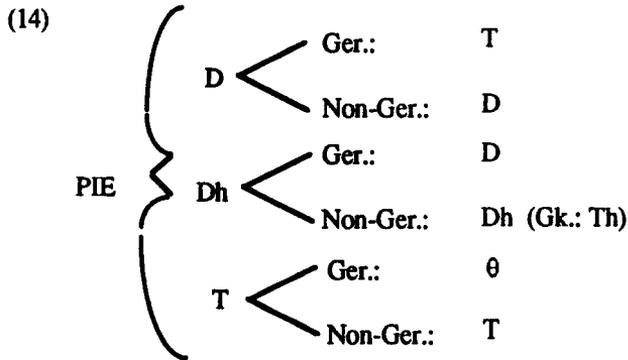
5. Applied Benefits

Given the argumentation above of how the Glottalic Theory would aid the reconstruction on grounds of typology, it would be beneficial to determine whether or not the new theory lends more insight into other troublesome areas of Indo-European study. This section reviews in part the application of the new theory to some traditionally unsatisfactorily explained 'laws' of Indo-European. The first to be addressed is Grimm's Law as seen through Vennemann's Bifurcation Theory. Next, Grassmann's Law for Sanskrit and Greek is offered for consideration à la Salmons. The new theory also has great potential for better explaining Lachmann's Law for Latin as shown by Kortlandt. Finally, §5.4 presents less striking yet worthwhile considerations of a miscellaneous nature.

¹⁰ T⁻ indicates a voiceless stop with breathy release.

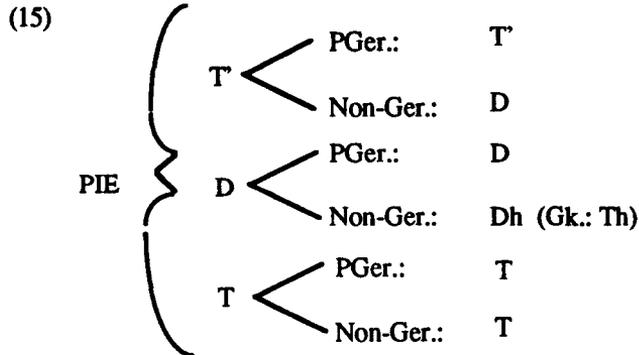
5.1 Grimm's Law

As one of the most intensively studied sound changes in the science of Linguistics, Grimm's Law has been appropriately drawn into the Glottalic Theory as crucial evidence of the theory's validity. This IE 'law' is a description of systematic sound correspondences between Germanic and Non-Germanic IE languages. The sound involved here are the three stop series of PIE, which according to Grimm's Law underwent the following changes:



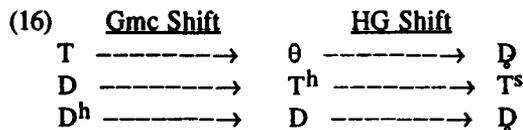
It has long been debated how to justify the assumed sound changes required to yield the developments $D^h > T^h$ (Greek) $> \theta$ (Latin). Desonorization would be a troubling circumstance difficult to explain according to naturalness constraints.

Viewing the sound changes from a Glottalic Theory perspective turns the tables, so to speak, and suggests Germanic and Armenian are the more conservative dialects contra the traditional view of the classical languages being more archaic/conservative. The changes shown in (15) suggest that not only was Germanic (and Armenian) more conservative in morphology and syntax as has long been held, but in phonology as well. The result then would be to see Germanic as more similar to PIE than was earlier believed.

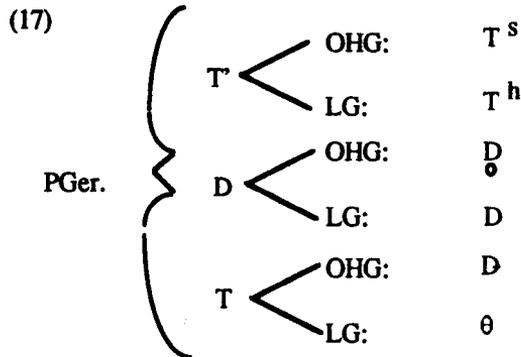


The set of sound changes in (14) would constitute what Grimm referred to as the First Sound Shift of Germanic or the Germanic Shift. It is clear though from (15) that from a Glottalic Theory point of view, Germanic is the IE dialect which did *not* shift.

The Second Sound Shift or the High German Shift of Grimm's Law refers to a split within the Germanic languages. According to Grimm, this shift occurred after the Germanic Shift and only took place in the Old High German (OHG) dialect. The two sound changes would then appear as follows:



The assumed sound change $D > T^h > T^s$ is highly improbable. If both sound changes are seen as dialectal split of Proto-Germanic rather than as a chronological sequencing of changes, the developments in the High German versus Non-High German dialects can be better explained. This is what is proposed in what Vennemann refers to as his Bifurcation Theory. Taking dialectal development from Proto-Germanic and the Glottalic Theory into consideration, one is faced with the following scenario in (17):



According to Vennemann's argument, the sound changes assumed for (17) would be more natural and more easily explainable than those assumed under Grimm's Law. Thus the new look of 'Grimm's Law' is a mirror image of the traditional look regarding which of the IE languages is more similar in phonology to PIE. Furthermore, the Glottalic Theory helps shed light on a traditionally murky area of PIE sound change.

5.2 Grassmann's Law

Another application of the Glottalic Theory is the phenomenon in IE known as Grassman's Law. Traditionally the 'law' held that PIE roots of the shape D^hVD^h underwent a rule of right to left dissimilation at a distance in Greek in Sanskrit yielding DVD^h roots. The motivation for this was thought to be a ban on two aspirates in a root. Preceding the rule for aspirate dissimilation must be a rule devoicing the aspirates in Greek.

(18)	Aspirate Devoicing	<u>Greek</u> T ^h V ^h T ^h	<u>Sanskrit</u> —
	Aspirate Dissimilation	TVT ^h	DVD ^h

The problem with this situation is one of ordering. If Grassman's Law applied first, the Greek examples would end up DV^hT^h. Yet having the devoicing apply first raises the question of how Grassman's Law could have applied identically in two completely distinct languages.

According to the Glottalic Theory Grassman's Law would be a moot point. If aspiration in Series II is allophonic as is argued by many proponents of the theory, then 'there is no need to posit two independent occurrences of a highly unusual phonological process in different PIE

daughter languages' and 'its restriction to one occurrence per root becomes mundane'. (Salmons 1993: 33)

5.3 Lachmann's Law

This rule of vowel lengthening in Latin can be related to the Glottalic Theory as well. Traditionally the rule states that Latin verbs with a long root vowel (CVT) are derived from PIE roots with CVD form, where C refers to an unspecified consonant. Alternately those verbs with short vowels derive from CVT or CVD^h roots. Defensible motivation for this scenario is difficult to obtain. Devoicing could not be a trigger for lengthening as this does not occur with the devoicing of the aspirates.

However, under the Glottalic Theory the rule is as follows: PIE verb roots of the shape CVT' become CVT and PIE verb roots of the shape CVD/CVT become CVT. If the glottalic series was interpreted in Latin as complex, pre-glottalized segments then vowel lengthening is easily explained.¹¹ Bisegmentalization and voicing of the stop then subsequent deletion of the glottal stop would cause compensatory lengthening of the preceding vowel. This is made more clear in (19).

$$(19) \text{ PIE CVT' } > \text{ CVT } > \text{ CV?D } > \text{ Latin CVT } \\
\text{ *H}_2\text{Vk'-} > \text{ a'k-} > \text{ a?g-tos } > \text{ Latin actus}$$

Beekes (1995) notes that in this view of the Glottalic Theory, the vowel-lengthening effect when the glottal stop is deleted is the same as that when a laryngeal is deleted in PIE. This would lend support for the hypothesis that one of the laryngeals (probably H₁) in PIE was in fact a glottal stop.

5.4 Miscellaneous

5.4.1 Bartholomae's Law

The two-step process christened Bartholomae's Law involves progressive voice assimilation and 'aspiration-hop' in Sanskrit when a voiced aspirate is followed by a plain voiceless plosive. To use a well-worn example, *bud^h + ta > buddha*. Although it is unclear whether the Glottalic Theory lends anything to this phenomenon, the changes in the rule would be as follows:

¹¹ See Beekes (1995) for further support of the analysis of the glottalic series as pre-glottalized.

(20)	<u>Traditional View</u>	/bud ^h + ta/	/ʃud + t ^h a/	<u>Glottalic View</u>
	Voice Assimilation	bud ^h da	ʃuddha	Voice Assimilation
	Aspiration-Hop	budd ^h a	_____	
		_____	buddha	Deglottalization

Although the Glottalic Theory seems to delete one step of Bartholomae's Law, namely aspiration-hop, this step feels intuitively natural given a cluster containing an aspirated segment. The side of the Glottalic Theory which admits both ejectives and implosives in Series I would assume that Sanskrit developed an implosive series which later underwent deglottalization. Therefore neither the old nor the new viewpoint wins out in terms of simplicity.

5.4.2 Danish Stød

As alluded to earlier in the treatment of Lachmann's Law, the pre-glottalized stops of Latin function much the same way as PIE laryngeals regarding vowel lengthening. Danish stød, a vowel lengthening process triggered by a following pre-aspirated stop, might thus be viewed as a related phenomenon. However, more extensive study of the process must be done before any real claims linking stød to the Glottalic Theory can be put forth.

Summary

This section has looked at various 'laws' of Indo-European and shown how they can be far better accounted for under the framework of the Glottalic Theory. The new look turns Grimm's Law on its head and turns the tables on Grassman's Law showing the 'decaying' Germanic and Armenian languages to be the truly conservative IE dialects. Lachmann's Law, it is demonstrated, can be seen as resulting from the loss of a glottal stop which formed part of an original complex pre-glottalic segment. This in turn shows the 'law' to function just as those segments central to the Laryngeal Theory. Bartholomae's Law neither won nor lost anything by applying the Glottalic Theory. However, this may be seen as neutral support for the theory. Finally it was noted that there is the possibility of linking Danish stød to the Glottalic Theory in the same way that the Laryngeal Theory was related.

Conclusion

This paper has presented the deficiencies of the traditional framework to deal with the obstruent system of PIE and of subsequent IE daughter languages. The foundation of the Glottalic Theory was put forth in order to show how the theory is more satisfactory and beneficial in the study of Indo-European and Historical Linguistics in general. Subsequent objections to the Glottalic Theory were presented followed by responses which demonstrated that the objections were either unfounded or moot points. Finally the Glottalic Theory was put to the test in order to see

whether it could better explain certain phonological phenomena throughout IE. Grimm's Law, Grassmann's Law and Lachmann's Law were shown to benefit greatly from the new system and Bartholomæ's Law and Danish stød were presented as possible additional evidence of the validity of the Glottalic Theory.

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