



Verner's law, phonetic substance and form of historical phonological description

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Jacob Grimm [ˈja:kɔp grɪm]
(1785-1863)



Karl Verner [kɑ(ː?)l 'væɹ̥nə]
(1846-1896)

Organization of this paper:

- I The traditional view on the Germanic consonant shifts**
- II Problems of the traditional view**
- III The Glottalic Theory**
- IV A formal analysis in SPE-style**
- V An optimality-theoretic / functional analysis**
- VI Conclusion**
- (VII Appendices)**

I The traditional view on the Germanic consonant shifts

1. The traditionally supposed Proto-Indo-European (PIE) obstruent inventory
2. Accent: transition from PIE accent to Germanic accent
3. Grimm's law
4. Verner's law

1. The traditional view on the Proto-Indo-European (PIE) obstruent inventory
(Lehmann 1952:8), in IPA notation:

	voiceless stops (<i>tenues</i>)	voiced stops (<i>mediae</i>)	breathy voiced stops ('voiced aspirated plosives', <i>mediae aspiratae</i>)
labials	p	(b)	b ^h
dentals	t	d	d ^h
velars	k	g	g ^h
labiovelars	k ^w	g ^w	g ^{wh}

/b/ is rare or missing. There is only one fricative: /s/

schematically: **T D D^h** in 4 places of articulation, **s**

2. Accent: transition from IE accent to Germanic accent

Change from IE free (i.e. lexically determined) stress to Germanic word-initial or root-initial stress

The change takes place at the beginning of the Germanic era (at least according to Lehmann 1961) and would have conditioned the Germanic sound shift (= law of Rask/Grimm).

Ex.:

<i>Proto-Indo-European (PIE)</i>	<i>Sanskrit (Skr.)</i>	<i>Ancient Greek</i>	<i>Gothic, Old English (OE)</i>
*pətḗr	pitár-	πατήρ [pa'te:r]	fádar (<i>Gothic</i>) fǽdar (<i>OE</i>)

3. Grimm's law (Rask 1818, Grimm 1822 + later amendments):

Act 1: voiceless plosives become spirantized (ex. PIE > Engl.):

p > f

t > θ

k > χ (h)

k^w > χ^w

*p_ǝd > foot

*tre_ǝj > three

*kāt- > hate

*k_ǝuod > what

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**pěd > foot* **trej > three* **kāt- > hate* **kʷod > what*

Act 2: breathy voiced plosives become voiced fricatives:

$b^h > *β$ $d^h > *ð$ $g^h > *ɣ$ $g^{wh} > *ɣ^w$

Stopping: “in addition, the resulting voiced fricatives tend to develop into voiced plosives” (Krahe/Meid 1969, § 62). Hence:

$b^h > *β > b$, $d^h > *ð > d$, $g^h > *ɣ > g$, $g^{wh} > *ɣ^w > g^w$

**b^hrātēr > brother* **d^hugæter > daughter* **g^haidos > goat* **g^{wh}ermos > warm*

3. Grimm's law (Rask 1818, Grimm 1822 + later amendments):

Act 3: voiced plosives become voiceless:

b (rare!) > p

d > t

g > k

g^w > k^w

*bend- > pen

*dekm > ten

*gelə- > cold

*g^wa- > come; kwamen (prét., néerl.)

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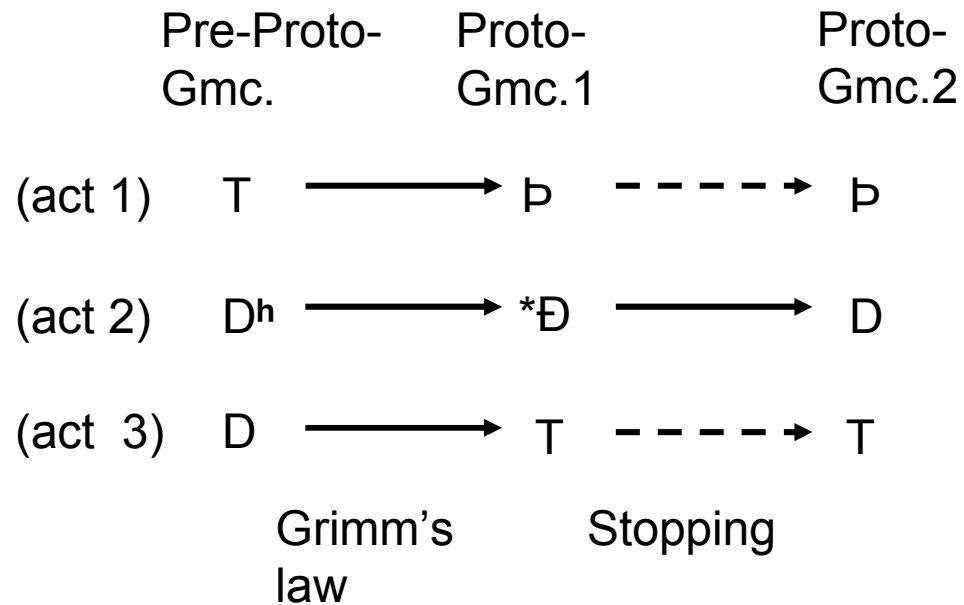
Act 3: voiced plosives become voiceless:

b (rare!) $> p$ $d > t$ $g > k$ $g^w > k^w$

General pattern: $T > P$; $D^h > *Ð > D$; $D > T$

3. Grimm's law (Rask 1818, Grimm 1822 + later amendments):

Recap (I) Grimm's law + stopping



4. Verner's law

Problem : ***grammatischer Wechsel*** 'grammatical alternation' (Lottner 1862)

Original /*p/ (no examples in the modern languages)

Old English *hebban - hōf hōfon hafan* ("to lift" cf. *heave*)

Original /*t/ (survives in modern German)

Old English: *cwēpan (cwīpp) cwæp - cwædon cweden* ("to say": cf. *quoth*)

Old English: *sēoþan (sīeþþ) sēap - sudon soden* ("to boil" cf. *seethe*)

Modern German: *schneiden - schnitt geschnitten* ("to cut")

Original /*k/ (survives in modern German and Dutch)

Modern German: *ziehen ziehe – zog gezogen* ("to pull")

Old English: *þeon (þīehþ) þāh - þigon þigen* ("to prosper" cf. German *gedeihen*)

Modern Dutch: *zien zie gezien - zag zagen* ("to see", Dutch lost intervocalic *h*)

Modern Dutch: *slaan sla - sloeg sloegen geslagen* ("to beat")

<i>Proto-Indo-European (PIE) (reconstructed)</i>	<i>Sanskrit (Skr.)</i>	<i>Ancient Greek</i>	<i>Gothic, Old English (OE)</i>	<i>Modern High German</i>
*b ^h rátēr	b ^h rātar-	φράτηρ (^h p ^h ra:te:r)	brōþar (<i>Gothic</i>) brōþor (<i>OE</i>)	Bruder
*pətér	pitár-	πατήρ (pa'te:r)	fadar (<i>Gothic</i>) fæder (<i>OE</i>)	Vater

Intervocalic voiceless stops (here, /t/) in PIE, Sk. and Anc. Grk. correspond to voiceless fricatives (here, /θ/ (þ)) in Gothic and OE, by spirantization (part of the Germanic sound shift).

However, **if the preceding vowel is not stressed** in PIE, Skr. and Anc. Grk., voiceless plosives correspond to voiced plosives in Gothic and OE. This latter phenomenon constitutes 'An Exception to the First Sound Shift' (title of Verner's 1876 article).

4. Verner's law (1876:114):

Indogerm. *k, t, p* gingen erst überall in *h, þ, f* über; die so entstandenen tonlosen fricativae nebst der vom indogermanischen ererbten tonlosen fricativa *s* wurden weiter inlautend, bei tönender nachbarschaft selbst tönend, erhielten sich aber als tonlose im nachlaute betonter silben.

“IE *k, t, p* first shifted to *h, þ, f* in all environments; the voiceless fricatives thus originating, together with the voiceless fricative *s* inherited from Indo-European, then became voiced medially in voiced environments, but remained voiceless when they were the final sounds of accented syllables.”
(Transl. by Lehmann 1967)

4. Verner's law (1876):

The voiced fricatives resulting from act 1 + Verner's law coincided with the voiced fricatives resulting from act 2 ($D^h > *Đ$) and both groups became occlusivized by a **stopping process**.

General pattern: $T > *Þ > *Đ > D$

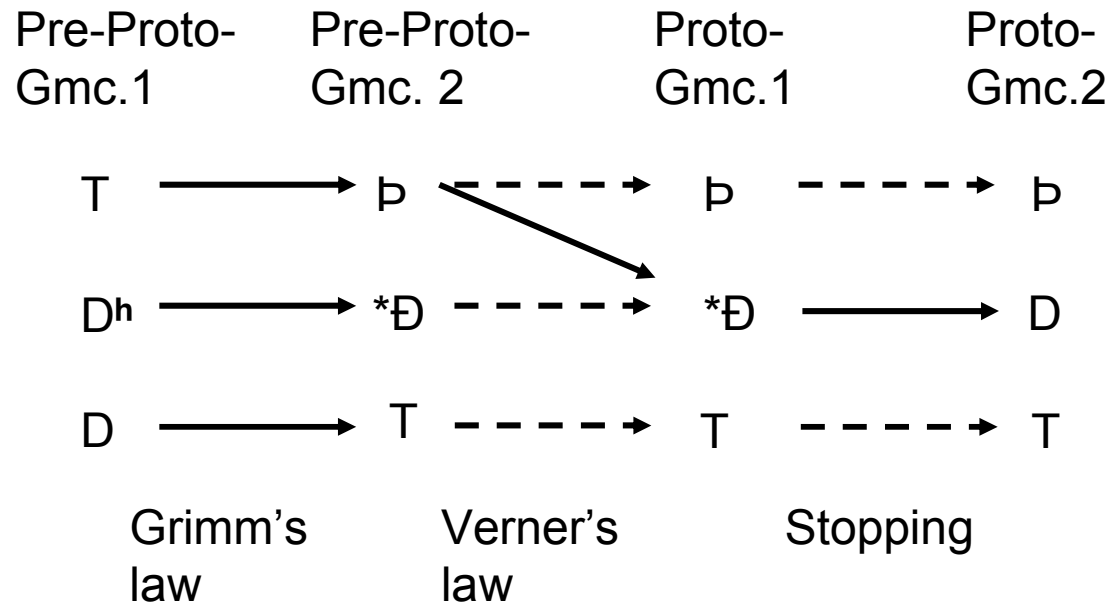
Example: $*pə'te:r$ (*PIE*) $> *faθar$ $> *faǰar$ $> 'faɗar$ (*Goth.*), *fæder* (*OE*)

Recap (II)

1. PIE obstruent system, classic view: T, D, D^h, s
2. Change from IE free (i.e. lexically determined) stress to Germanic word-initial or root-initial stress
3. Grimm's law: T > Þ; D > T; D^h > *Ð > D
4. Verner's law: (T >) *Þ > *Ð > D, intervocalically after an unstressed vowel

Recap (III)

Germanic sound shifts under the traditional view



II Problems of the traditional view

1. Regarding the PIE obstruent inventory
2. Regarding the relative order of the Grimm's and Verner's laws
3. Regarding the stopping (occlusivization) process

1. Regarding the PIE obstruent inventory

A methodological criticism:

The method of internal reconstruction and the comparative method (on which the classical obstruent inventory is based) are mechanical techniques, that do not take into account considerations of language typology (cf. Martinet 1955, Jakobson 1958).

From Pedersen (1951) onwards: growing doubts regarding the traditional view on the PIE obstruent inventory.

1. Regarding the PIE obstruent inventory

- a. The traditional pattern T, D^h, D is strange because a language with D^h obstruents (breathy voiced stops or ‘voiced aspirates’), but without concomitant voiceless aspirates, is **extremely unusual** (as pointed out by Jakobson 1958) (but according to Blust (1969, 1974, 2006) Kalabit would be such a language).

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- b. b is rare or missing in the traditional pattern. This is unusual. If a voiced plosive is missing in a system, it is generally g , like in Dutch. If a voiceless stop is missing, it is the labial p ; and with ejectives, the gap is nearly always p' .

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- c. odd phonotactic constraint in PIE: *voiced plosive – vowel – voiced plosive, ($*DVD$, “**deg* constraint”).
- d. the ‘classic languages’ (especially Sanskrit) seem close to PIE but Germanic seems to have undergone very important sound changes in the transition from PIE. No consideration at all is given to the logical possibility that it is Sanskrit that has undergone important changes compared to PIE.

2. Regarding the relative order of the Grimm's and Verner's laws

Verner's law refers to PIE free (or lexically determined) accent, which was supplanted by Germanic initial accent. Lehmann (1952) assumes that the shift to initial accent has triggered Grimm's law. If this is indeed the case, after the working of Grimm's law accent was thus initial and hence not free. However, Verner's law applies *after* Grimm's law but nevertheless refers to the PIE free accent.

This leads to a **paradox**, which has given rise to an abundant literature in the first half of the 20th century.

3. Regarding the stopping (occlusivization) process

Why not simply $T > D$ (instead of $T > \beta > \mathcal{D} > D$) ?

Verner (1876:101):

“On the other hand, the Germanic voiced stop cannot have resulted directly from the Indo-European voiceless stop by voicing, for this would be a sound innovation ***directly counter to the main direction of the sound shift*** (i.e. act 2 of Grimm’s law, $D > T$, RN), which produced a voiceless stop from the Indo-European voiced stop.”

Translation by Lehmann (1967) (emphasis mine, RN)

3. Regarding the stopping (occlusivization) process

Act 2 of Grimm's law as well as Verner's law need a general stopping (or occlusivization) rule. However, occlusivization which is not a general process among languages, and is only found as a result of analogical leveling (Vennemann 1984:8).

“I do not know of any attested example of occlusivization of an entire range of voiced fricatives in all positions, and even in top of that while maintaining the integrity of the whole range. **I even doubt whether such a sound change is at all possible.**”

(Vennemann 1984:8, my translation)

3. Regarding the stopping (occlusivization) process

On top of this: there is **NO** example of the only fricative of PIE (i.e. not being the result Grimm's spirantization), i.e. **s**, turning into a stop!

This fact has gone thusfar unnoticed!!

III The Glottalic Theory

1. Remedy: the Glottalic Theory

- The Glottalic Theory was proposed in different versions by Hopper (1973), Gamkelidze & Ivanov (1973, 1995), Vennemann (1984), Kortlandt (1985), endorsed by Lehmann (2002). Fairly dominant over the past 25 years.
- Traditional voiced plosives D are taken to be glottalized plosives in the glottalic theory, from which at least the Armenian and Germanic consonant series derive much more easily.
- Furthermore, D^h is replaced by D. D^h only occurs in Sanskrit and Armenian, but alongside T^h (which developed later from other sources).

2. Supposed Proto-Indo-European (PIE) obstruent inventory according to the glottalic theory

<i>Traditional</i> Lehmann 1952	T	D	D ^h
<i>Glottalic theory</i> Hopper 1973	T	T'	D

T' = glottalized plosive

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Consequence: assuming T T' D instead of T D D^h,

act 2: D^h > *Ḍ > D is **eliminated**

and act 3: D > T is replaced by T' > T (**Deglottalization**)

3. Consequences for the mentioned problems regarding the PIE obstruent inventory:

- a. There are no longer voiced “aspirates”. (ou or breathy voiced stops: D^h). The problem with the presence in the inventory of D^h without T^h is thus resolved.
- b. The b that was absent is now p' (glottalized p) under the glottalic theory. This is perfectly normal: a closure + heightening of the glottis cannot be perceived in combination with a total closure of the lips. Therefore, $[p']$ is very rare in the world's languages. The problem of the non-occurrence of b is thus resolved.
- c. The constraint $*D + V + D$ (“**deg*”) finds its natural explanation in the fact that it is difficult to pronounce two glottalized stops so close to each other. This constraint is comparable to Grassmann's law in Ancient Greek (no aspirated stops close to each other (cf. *tit^hēmi* (τιθημι) 'to put' in stead of **t^hit^hēmi* (*θηθημι) cf. the reduplication in the perfect tens *tet^hēka* (τεθηκα). Hence, the problem with the **deg* constraint has been resolved..

4. Consequences for Verner's law

- As pointed out by Vennemann (1984), under the assumption of the glottalic theory, Verner's law can be assumed **to have taken place before Grimm's law**, because while it changes T into D, under the glottalic theory, act 3 of Grimm's law does not exist anymore (which would change it back into T).

This is so because D in the obstruent inventory (under the traditional view) has been replaced by T' (under the glottalic theory).

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- No more mystery: this is what one would expect in the first place: Verner's law simply **bleeds** the first act of Grimm's law (spirantization, or the *urgermanische Lautverschiebung* 'Proto-Germanic sound shift' in Vennemann's terms).

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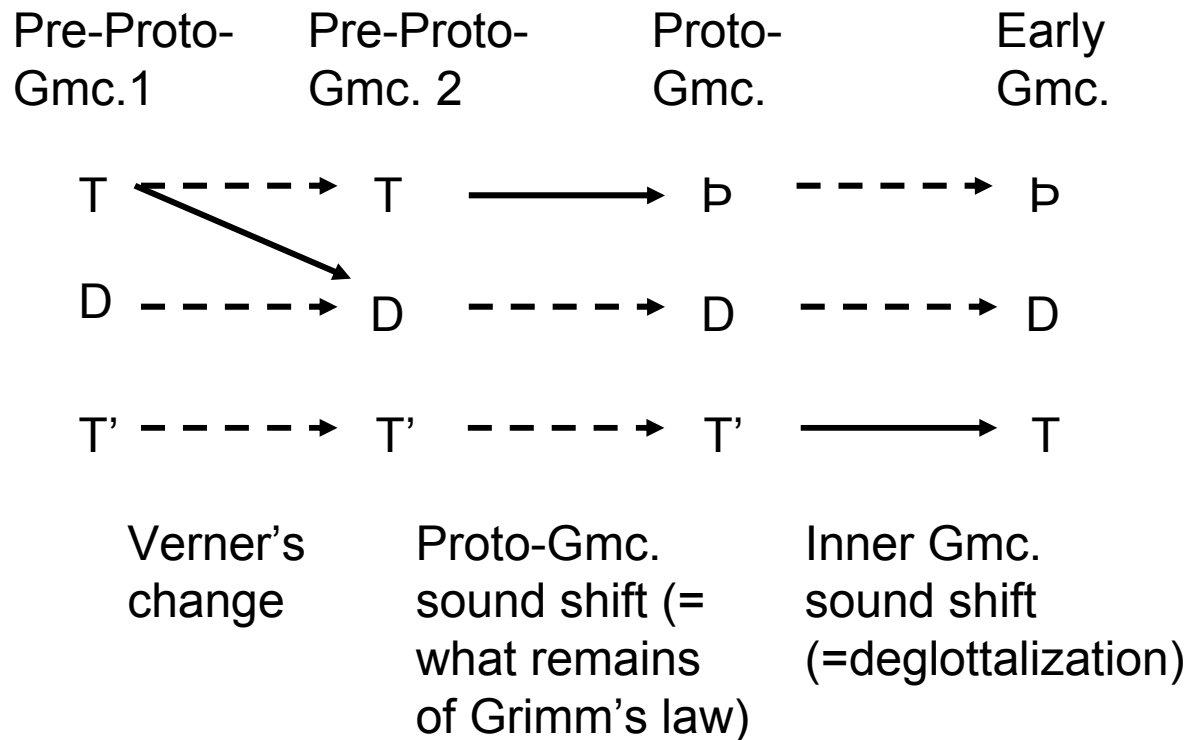
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- Verner's law is now more general: it involves voicing all types of plain (i.e., non-glottalic) obstruents (not only fricatives).

5. Germanic sound history under the glottalic theory (minus the High German sound shift) Venneman (1984)



IV A formal analysis in SPE style

An analysis in SPE style

Let us assume for that Grimm's Law act 1 and Verner's Law were synchronic. Then, the Structural Description of one rule (i.e. intervocalic voicing: Verner) is a subset of the other (spirantization : Grimm's act 1):

Verner's rule (intervocalic voicing)

$$\left[\begin{array}{l} - \text{ voice} \\ - \text{ constr.gl.} \end{array} \right] \rightarrow [+ \text{ voice}] / \left[\begin{array}{l} \text{ V} \\ + \text{ stress} \end{array} \right] ([+ \text{ voice}]) \text{ ____ } \text{ V}$$

Grimm's act 1 Germanic spirantization

$$\left[\begin{array}{l} - \text{ voice} \\ - \text{ constr.gl.} \end{array} \right] \rightarrow [+ \text{ cont}] \text{ (without context)}$$

(constr.gl. = constricted glottis; this feature distinguishes glottalised plosives from plain plosives)

Elsewhere Condition (Kiparsky 1973, 1982), **Proper inclusion precedence** (PIP, (Koutsoudas, Sanders & Noll 1974)):

The most specific rule has precedence over the more general rule

Hence, intervocalic voicing (Verner) has precedence over spirantization (Grimm)

→ This shows that the laws of Grimm and Verner must be somehow interrelated ←

Ex.

aká → agá (by virtue of Verner, Grimm act 1 cannot function pas because of the Elsewhere Condition / PIP)

áka → áha (by Grimm act 1, Verner cannot function because its structural description is not satisfied)

V An optimality-theoretic / functional analysis

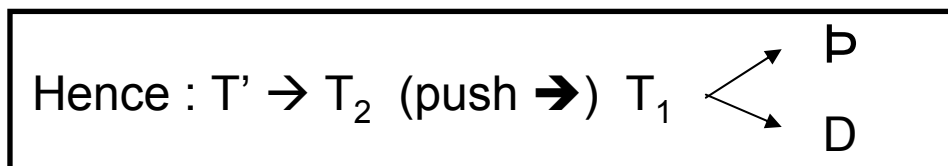
Hypothesis : spirantization (Grimm 1) and (phonemic) intervocalic voicing (Verner) are the result of a push chain.

PIE T' (glottalized stop) loses progressively its ejective character peut-être sous une influence substratale (this is Grimm act 3 under the Glottalic Theory). Hence it invades the territory of PIE T (plain voiceless stop). This type of segment is squeezed out of its original mode of articulation and becomes either a fricative, or a voiced stop.

The push chain takes effect because the **functional load** (rendement fonctionnel, (terme by Martinet 1955) between T' en T is too big for allowing for a fusion of the two categories.

In fact, this assumption is not new, but has been advanced, for acts 1 and 3 of Grimm's law, by Grimm (1848:393), Luick (1898, 1964:805), Kretschmer (1932:272-273), Fourquet (1948). What *is* new is that it is combined with Verner's law and the Glottalic Theory.

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As one see, there is a **bifurcation** or **split**. The cause of the transformation undergone by T_1 is the invading behavior of T' , but the push itself does not explain the nature of the change, which seems to be conditioned by the location of stress (T is voiced and becomes D if the preceding syllable précédente is unstressed, otherwise it spirantizes and becomes b).

A separation of the trigger and the nature of the change is not possible in the SPE (or any other Markovian model), cf. The general rule scheme:

$A \rightarrow B / C _ _ D$

In Optimality Theory the trigger and the substance of the change are by definition separated.

5. Verner's law under OT: bifurcation (I)

De Jong et al. 1993: reduced coarticulation within stressed syllables. Let us extend this to 'co-manner of articulation' (i.e. voicing or non-voicing).

Five constraints:

- A. ***T₁**: an original Voiceless Plain Stop is forbidden. (induces laws of both Grimm and Verner). This constraint is not universal, but induced by Deglottalization.
- B. Markedness constraint: Intervocalic Voicing (**IntvocVoi**): intervocalic (non-glottalic) consonants should be specified [voice].
- C. Faithfulness Constraint: Identpoststress (Laryngeal) (**IdentPostStrLar**)
Consonants directly after a stressed vowel should be faithful to underlying laryngeal specification (expression of De Jong et al's views; cf. Lomdardi 1999:270 who postulates IDOnsetLaryngeal).
- D. Faithfulness constraint: **IdentLar**. Do not change the laryngeal specification of a segment.
- E. A faithfulness constraint: **Ident-[cont]**, which says that the specification of [cont] should be maintained.

5. Verner's law under OT: bifurcation (II)

' bro:tar	*T ₁	IdentPostStrLar	IntvocVoi	IdentLar	Ident-[cont]
' bro:tar	*!		*		
' bro:dar		*!		*	*
☞ ' bro:θar			*		*
' bro:ðar		*!		*	*

pa'tar	*T ₁	IdentPostStrLar	InvocVoi	IdentLar	Ident-[cont]
pa'tar	**!		*		
ba'dar				**!	
ba'θar			*!		*
☞ fa'dar				*	
fa'ðar				*	*

5. Verner's law under OT: bifurcation (III)

The picture of the Germanic Sound can now be simplified:

Pre-Proto- Gmc.		Proto- Gmc.
--------------------	--	----------------

T_1 \longrightarrow þ

D --- D

T' \longrightarrow T_2

$T_2 \blacktriangleright T_1$ (\blacktriangleright = push)

Grimm OR
 Verner
 (spirantization OR
 intervocalic voicing)
 (+deglottalization)

VI Conclusions

1. If one assumes the Glottalic Theory, Verner's law can be seen as intervocalic voicing (or lenition), which is now more general (less marked), because it applies to fricatives and stops, hence to obstruents in general. Upshot: no marked 'stopping', no unattested intermediate stages. For some forms, a less marked later applying spirantization has to be assumed (like *fadar* > *faðar* for some branches of Germanic).
 2. In an OT account, the Verner facts come out as a result of the working of the constraints prohibiting a voiceless plain stop (*T), Laryngeal Identity in post stress position (IdentPostStrLar), a requirement of intervocalic consonant to be voiced, and lower ranked general prohibitions against voicing and changing the specification of [cont].
- Major Upshot: conditioning and remedies are **separated**, allowing for **bifurcation**: there is no **need to postulate an unattested chronological ordering of voicing and spirantization**. ◀

VII Appendices

1. Similar processes in other languages

a. Standard German

Jé[f]er (town in Northern Germany) vs. Je[v]eriáner ‘inhabitant of Jever’

Hannó[f]er vs. Hanno[v]eriáner

(Schröder 1918)

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b. Eichsfeld (Thuringia) German

pazí : re (Standard German: passieren) ‘to pass’ vs. páse (passen) ‘to fit’

marzí : re (marchieren) ‘to march’, mazí : f (massif) ‘massive’, mazekrí : re (massakrieren) ‘to massacre’ vs. máse [Masse] ‘mass’

interezíre (interessieren) vs. inträsen ‘interests’

(Hentrich 1920)

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1. Similar processes in other languages

c. English

In French loan words *ks*, *ps* and *s* are voiced after an unaccented syllable, but remain intact after a syllable bearing primary or secondary accent:

e[gz]híbit vs. è[kks]hibítion

a[bz]ólve vs. à[ps]olútion

di[z]ólve vs. di[s]olútion

(Jespersen 1891, 1933:238)

cf. also. á[kks]ent vs. e[gz]áctly

VII Appendices

2. Supposed Proto-Indo-European (PIE) obstruent inventory according to the glottalic theory: other versions

<i>Traditional</i>			
Lehmann 1952	T	D	D^h
<i>Glottalic theory</i>			
Hopper 1973	T	T'	D
Gamkrelidze & Ivanov 1973	T ^(h)	T'	D ^(h)
Vennemann 1984	T ^h	T'	D̰

T^(h), D^(h) = plosives with allophonic aspiration

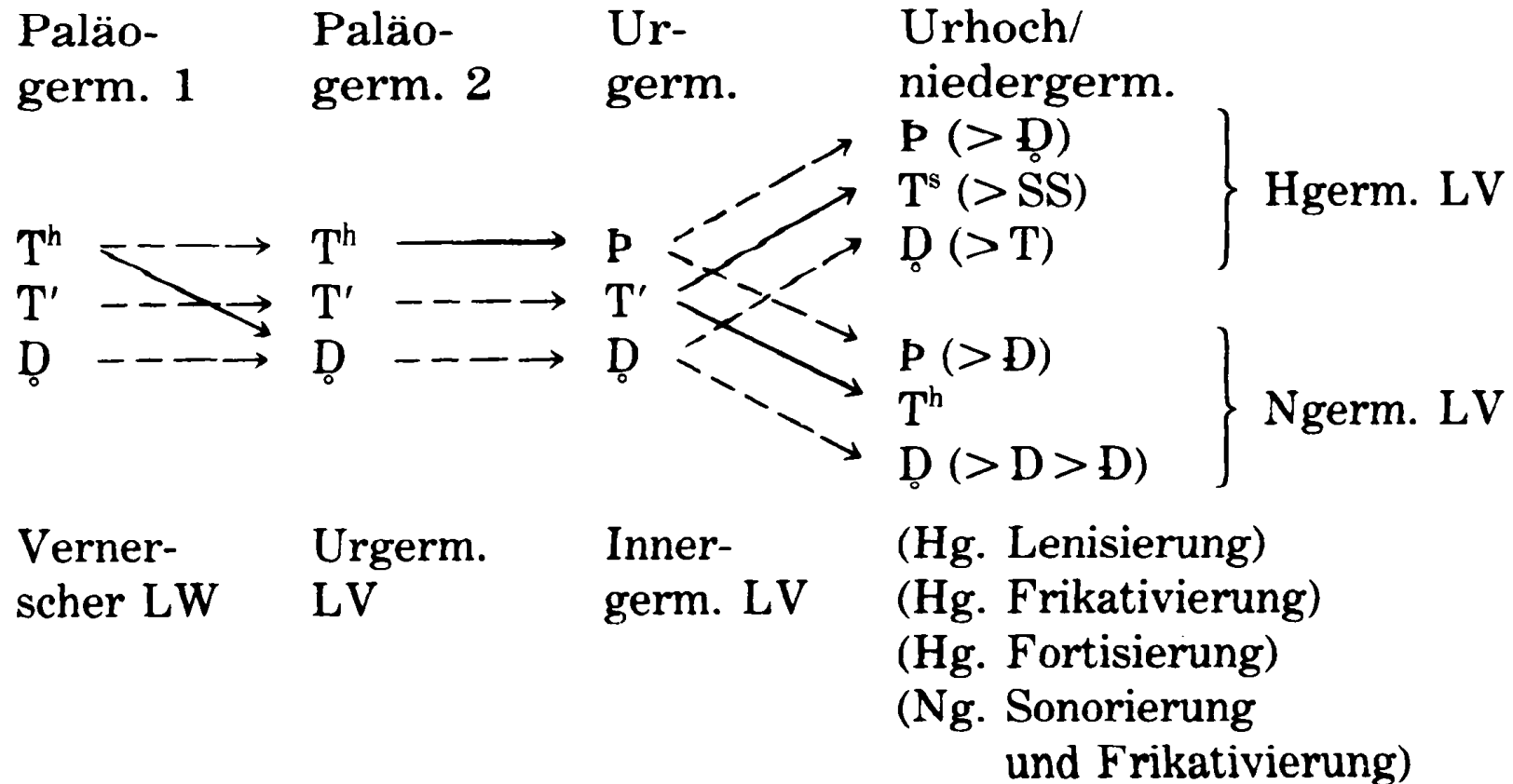
T' = glottalized plosive

T' = 'voiceless plosive with some fortis feature'

D̰ = lenis plosive

VII Appendices

5. Venneman's (1984) vision on Germanic sound history: bifurcation!!



(LW = Lautwandel = sound change; LV = Lautverschiebung = sound shift;
Ng(erm.) = Low Germanic)