

On the emergence of the Dutch laryngeal system

Katalin Balogné Bérces ♀ and Dániel Huber ♂
♀ PPKE, Piliscsaba, Hungary; ♂ Université de Rennes 2, France
bbkati@yahoo.com huberd@freemail.hu



I. INTRODUCTION

1 The 3 related problems

- What is exactly the laryngeal situation in Dutch varieties?
- Is Dutch a [voice] or a [spread glottis] ([sg]) language?
- How did Dutch become like that? (How long has Dutch been a [voice]/[sg] system?)

2 The background

- Dutch laryngeal assimilations show untypical patterns
(Booij 1995, Iverson & Salmons 2008, etc.)
 - a) all voiceless obstruents trigger the devoicing of a *following* voiced fricative
 - b) voiced stops /b d/ trigger *regressive* voicing assimilation of all obstruents
- therefore, Dutch seems to exploit *both* [sg] and [voice] in a binary system
- This is both strange for a Germanic language and deemed impossible under laryngeal realism
- The origin of voicing was attributed to Romance/French influence
(Iverson & Salmons 2003b, 2008, etc)

3 The theoretical background for this paper

3.1 Laryngeal realism (Honeybone 2001/2002, 2005)

- Honeybone (2005:337) on research by Vaux, Tsuchida, Cohn & Kumada, Iverson & Salmons, Jansen:

“A reasonable null hypothesis remains, however, that specifications will be the same across obstruent classes within one language, unless there is evidence to the contrary.”

3.2 Government phonology (KLV 1985, Backley & Takahashi 1998, Honeybone 2005, etc)

- privativity
- government and licensing:

The forces defining the asymmetric relations between positions

licensing means stability/fortition
lack of licensing means (one type of) lenition
(government means (another type of) lenition)
(Ségéral & Scheer 1999, Szigetvári 1999, etc.):

“Proper Government inhibits segmental expression of its target.”
“Licensing comforts segmental expression of its target.”
(Ségéral & Scheer 1999: 20)

3.3 Modified *Leiden model* to represent phonological structures

(Nasukawa & Backley 2005)

consonants		vowels	
EDGE	{h, ?} = X	FUNDAMENTAL	{A} = X
SOURCE	{N}	RESONANCE	{I, U}
RESONANCE	{I, U}	SOURCE	{N}
FUNDAMENTAL	{A}	EDGE	{h, ?}

3.4 Privative [voice] and [spread glottis] contrasts

voiceless	voiced	nasals
[]	[<u>N</u>]	[N]
aspirated	unaspirated	(released?)
[<u>h</u>]	[]	[h]

4 The proposals

- Dutch uses *only one, privative*, feature in its laryngeal system, conforming to laryngeal realism
- arguments are strong in favour of either [voice] or [sg], and they both run into representational problems
- nevertheless, [sg] may turn out to give a better fit
- French influence is too late to influence Dutch
- Latin could already be in contact with [voice] Germanic languages
- (the ancestor of) Dutch lost [sg] in stops under the influence of Latin (or Romance)

II. THE ANALYSES

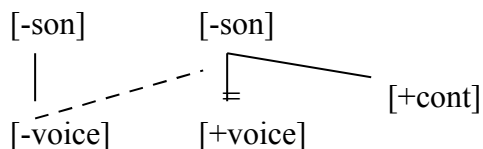
1 Obstruent assimilation patterns in Dutch in Booij (1995:58-64): a first approach

(1a) *Progressive Assimilation Rule*: “a fricative is devoiced after a voiceless obstruent”
 (Booij 1995:58, data *op.cit.* 58-59, but presentation modified)

opvallend	/p#v/ > [pf]	‘remarkable’
stoepzout	/p#z/ > [ps]	‘pavement salt’
opgraving	/p#ɣ/ > [px]	‘excavation’
zoutvat	/t#v/ > [tf]	‘salt tub’
zoutzuur	/t#z/ > [ts]	‘hydrochloric acid’
straatgoot	/t#ɣ/ > [tx]	‘gutter’
dakvenster	/k#v/ > [kf]	‘dormer’
?kz ¹		
?ky ¹		
afval	/f#v/ > [f:]	‘trash’
afzuigen	/f#z/ > a[fs]uigen	‘to extract’
afgang	/f#ɣ/ > [fx]	‘failure’
asvat	/s#v/ > a[sf]at	‘ashbin’
waszak	/s#z/ > [s:]	‘laundry bag’
wasgoed	/s#ɣ/ > [sx]	‘laundry’
pechvogel	/x#v/ > [xf]	‘unlucky person’
lachzak	/x#z/ > [xs]	‘laughing machine’
lachgas	/x#ɣ/ > [x:]	‘laughing gas’

¹ No example is given in Booij, although nothing seems to exclude these clusters

(1b) Booij’s (1995:60) representation

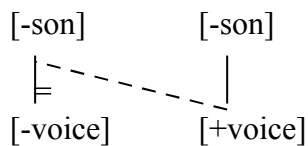


this representation is only descriptively adequate; it does not explain, eg, why fricatives should behave so (rather than the stops)

(2a) Regressive Assimilation Rule: “voiceless obstruents become voiced before a following voiced stop” (Booij 1995:59)

klap b and	/p#b/ > [b:]	‘flat tyre’
op d ruk	/p#d/ > [bd]	‘imprint’
eet b aar	/t#b/ > ee[db]aar	‘edible’
pot d icht	/t#d/ > [d:]	‘tight’
koek b oek	/k#b/ > koe[gb]oek	‘cookery book’
zak d oek	/k#d/ > [gd]	‘handkerchief’
af b ellen	/f#b/ > [vb]	‘to ring off’
stof d oek	/f#d/ > [vd]	‘duster’
kas b oek	/s#b/ > [zb]	‘cashbook’
mis d aad	/s#d/ > [zd]	‘crime’
lach b ui	/x#b/ > [ɣb]	‘fit of laughter’
lach d uif	/x#d/ > [ɣd]	‘laughter’

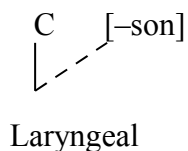
(2b) Booij’s (1995:60) analysis:



(3a) Past tense allomorphy: Progressive voicelessness assimilation affecting -de

<i>present stem</i>	<i>past sg. form</i>	<i>gloss</i>
ze/t/	ze[t+t]e	‘to put’
vi/s/	vi[s+t]e	‘to fish’
re/d/	re[d+d]e	‘to save’
raa/z/	raa[z+d]e	‘to rage’
roe/r/	roe[r+d]e	‘to stir’
zoe/n/	zoe[n+d]e	‘to kiss’

(3b) Laryngeal spreading (Booij 1995:62, slightly modified)



(4) Summary of...

...what is [voice] and what is [sg] in Dutch laryngeal phonology, compared to “purely” [voice] (e.g. Hungarian) and [sg] (English) languages, with examples

<i>Inpu t</i>	<i>output</i>		
	Hungarian	Dutch	English
TD - >	DD – fokban 'in degree' (= fogban 'in tooth')	DD – opdruk 'imprint'	TT – matchbox
DT - >	TT – fogtól 'from tooth' (= foktól 'from degree')	TT – schandpaal 'pillory'	TT – bagpipe
SZ - >	ZZ – (hypothetical) rézzzene 'music of part' (=rézzzene 'copper music')	SS – asvat 'ashbin'	SS – push them
ZS - >	SS – rézszerű 'copper-like' (≈ ésszerű 'reasonable')	SS – graafschap 'county'	SS – gravestone
TZ - >	DZ – (hyp.) fokzene 'degree music' (= (hyp.) fogzene 'tooth music')	TS – opvallend 'remarkable'	TS – deep valley
DS - >	TS – fogszerű 'toothlike' (= fokszerű 'degree-like')	TS – aard(s) (< aarde) 'earthly'	TS – bigfoot
SD - >	ZD – mézben 'in whitewash' (= mézben 'in honey')	ZD – misd(a)ad 'crime'	ST – birthday
ZT - >	ST – méztől 'from honey' (= mésztől 'from whitewash')	ST – gift (< geven) 'gift'	ST – cheesecake

T stands for voiceless stop, D for voiced stop, S for voiceless fricative, Z for voiced fricative (where "voiced" and "voiceless" are used in the traditional, abstract phonological sense)

It can be seen that Dutch patterns like [sg] systems, apart from RVA triggered by stops and having scope over any obstruent.

(5) Conclusions

- Dutch is a mixed system
- it can be pointed out that
 - a) only RVA makes Dutch a [voice] system
 - b) the fricative system is based on [sg]
 - c) the past tense allomorphy is also based on [sg]

2 The re-analysis of the Dutch patterns in a laryngeally realistic way

2.1 Privative analysis *à la* Iverson & Salmons (2003b, 2008)

- Dutch is a mixed system: fricatives=[sg], stops=[voice]
- finally: de-laryngealization (“devoicing”, “deaspiration”)

Problems:

- how to get [voice] (SOURCE) in fricatives under regressive voicing assimilation if [voice] (SOURCE) is not defined lexically?
- why does the [sg] (EDGE) of a fricative not get realized under regressive voicing assimilation?

2.2 The laryngeally realistic privative analysis: two theoretical possibilities

- in a system of binary laryngeal oppositions:
[marked value] vs. [unmarked value], *[marked value] vs. [marked value]

2.2.1 Dutch is a [voice] system (as is commonly assumed): [voice] vs. *unmarked*

- fricatives behave unexpectedly:
- their behaviour is *either* the residue of a [sg] Germanic variety (perhaps they preserve the Germanic innovation Iverson & Salmons (2003a, etc.) call “Germanic enhancement”) *or* it is an innovation
- “Germanic enhancement”: a pervasive change of phonetic aspiration in voiceless stops that came before Grimm’s Law
- Iverson & Salmons (2008:261):
“[...] Dutch attests a mixed pattern, retaining aspiration-language fricatives but adopting a [voice] system in the stops.” (emphasis ours)
- stops can be lexically voiced or unmarked (=voiceless), but fricatives are all *unmarked* lexically and voicing is spread from a following vowel.
- [voice] in word-initial fricatives is licensed by the following non-empty nucleus

(1) The lexical representation of the voicing contrast in Dutch stops

[p]	[b]	[t]	[d]	[k]
[]	[N]	[]	[N]	[]

The lexical representation of the voicing contrast in Dutch fricatives

[f]	[v]	[s]	[z]	[x]/[χ]
[]	[]	[]	[]	[]

(2a) The partial representation (in CV terms) of 4 Dutch words:
vis ‘fish’, *zes* ‘six’, *doek* ‘towel’ and *fiets* ‘bike’

C	V	C	v
[h]	[]	[h]	
[N]	< [N]		
[U]	[]	[]	
[]	[I]	[]	
[]	[]	[]	
v	i	s	

(2b)

C	V	C	v
[h]	[]	[h]	
[N]	< [N]		
[]	[]	[]	
[]	[I]	[]	
[]	[A]	[]	
z	ɛ	s	

(2c)

C	V	C	v
[?]	[]	[?]	
[N]	[N]	[]	
[]	[U]	[]	
[]	[]	[]	
[]	[]	[]*	
d	u	k	‘towel’

*This representation does not (cannot) reflect the structural distinction between coronals and velars.

(2d)

C	V	C	v	C	v
[h]	[]	[?]		[h]	
	[N]	[]			
[U]	[]	[]		[]	
[]	[I]	[]		[]	
[]	[]	[]		[]	
f	i	t		s	‘bike’

Problems:

- why does *asvat* > *a[sf]at* take place if [f] is followed by a vowel?
- why does [f] voice in *a[vb]ellen* before a [voice] stops if it has no tier to accommodate [voice]?

(3) Representations:

C	v	C	V	
[h]		[h]	[]	
		[]	[N]	
[]		[U]	[U]	
[]		[]	[]	
[]		[]	[A]	
...	s	f	a	‘ashbin’

C	v	C	V	
[h]		[?]	[]	
???	<<<<<<<	[N]	[N]	
[]		[U]	[]	
[]		[]	[I]	
[]		[]	[A]	
v		b	ϵ	‘to ring off’

(4) Conclusion

- If Dutch is assumed to be [voice], then we run into representational problems in a constrained theory like GP

2.2.2 Dutch is a [sg] system (just like the other Germanic languages): [sg] vs. unmarked

- word-initial pre-voicing (both in fricatives and stops) is a phonetic illusion like we claim it is in Swedish, contra Helgason & Ringen (2008):
- there is no initial lexically voiced obstruent
- stops behave unexpectedly: why is there RVA?

Proposals:

- since /b d/ are the only segments triggering RVA, the only problem is RVA
- if Gmc was still [voice] after Grimm's Law (contra Iverson & Salmons), the behaviour of these segments is the residue of that [voice] system, while the rest of the system became [sg] like in other Gmc languages at a later time
- if Gmc was [sg] after Grimm's Law (as described in Iverson & Salmons), the behaviour of these segments is the result of Latin /Romance influence, while the rest of the system was left unharmed by foreign influence
- note that Dutch is peripheral in the Gmc continuum (similarly to Scottish English), which would either favour the retention of relics in the phonology, or the greater exposure to foreign influence (the latter is out in the case of Scottish English)
- /b d/ are the only obstruents that Latin could influence since fricative allophony worked differently in Latin

(4) The lexical representation of the [sg] contrast in Dutch stops

[p]	[b]	[t]	[d]	[k]
[h]	[]	[h]	[]	[h]

The lexical representation of the [sg] contrast in Dutch fricatives

[f]	[v]	[s]	[z]	[x]/[ç]
[h]		[h]		[h]

(5) Representations

(5a) C v C asvat “asvat” /s#v/ > a[sf]at ‘ashbin’
[h] []
s f

the realization [f] is purely phonetic

(5b) C v C eetbaar “eetbaar” /t#b/ > ee[db]aar ‘edible’
[h] []
d b

what prevents the element [h] under /t/ from surfacing?

(6) Problems:

- how to represent RVA in a [sg] language?
(there is no SOURCE element to spread)
- why does aspiration never appear on [sg] stops in any position?

(7) Conclusions

- Dutch is a mixed system, which cannot be represented satisfactorily in a constrained theory like GP (as opposed to Classical Generative Phonology or Optimality Theory)
- indeed, GP predicts that such systems cannot exist
- Dutch seems to be an example of improper language contact, but the system as a whole is still learnable because its subsystems are natural

III. THE CONTACT BETWEEN LATIN/ROMANCE AND GERMANIC

1 The hypothetical course of events

- Latin came into contact with Germanic people and their languages from the end of the 2nd c. CE in northern Gaul
- these people were romanized and it is possible that at this time their languages incorporated some aspects of a [voice] system, notably in the stops
- If Iverson & Salmons's position is accepted, then this laryngeal re-arrangement is an innovation in these varieties
- If, however, Germanic was still a [voice] system at this time, then Latin did not influence Germanic in this respect, moreover, the emergence of the [sg] system must be later
- Salian Frankish (=Old West Low Frankonian) and Burgundian were probably [voice] languages in their stops, as opposed to Ripuarian Frankish (=Old East Low Frankonian) and the predecessor of Alemannic dialects which were fully [sg] systems

- This would explain:
 - a) why Germanic, more precisely Frankish, loanwords in Romance languages seem to come from a [voice] language, and
 - b) why modern Dutch, from Old West Low Frankonian, preserves elements of a [voice] system in its stops

2 The crucial laryngeal characteristics of the respective languages

2.1 Latin is a [voice] language as shown by regressive voicing assimilation

- a) Latin stem *reg-*
reg-em (regem) 'king; ACC' reg-s > re[ks] (rex) 'king; NOM'
stem- ACC stem- NOM
- reg-o (rego) 'I rule' reg-s-i > re[ks]i (rex) 'I have ruled'
- b) Latin stem *nig^w-*
ni-n-gu-it (ninguit) 'it is snowing; IMPF' nig-s > ni[ks] (nix) 'snow; NOM'

IE voiced aspirates became devoiced and turned into voiceless fricative /f h/ (and into voiced stops /b d/ medially only in Latin) as early as Common Italic (hypothetically dated to 1000 BCE, cf. Adamik (2009:94) and references therein.

2.2 There is no word-final devoicing in Latin (in any of its historical phases)

finally, voiced obstruents have limited distribution (grammatical words)

ab 'from';

ad 'to', *apud* 'at, with', *sed* 'but', *haud* 'not', *id* 'that; NT, SG', *quod* 'which; NT, SG'

2.3 Grimm's Law is generally dated to BCE 500 or BCE 400-250

- most handbooks on Germanic or IE tend not to give a date, like Fortson (2010) or Beekes (1995)
- there is simply no internal dating
- external dating may be based on Greek *cannabis* borrowed into Gmc giving /x/ reflexes (in the 5th c. BCE) and on the attested arrival of Germanic peoples near Roman territory

3 The contact

3.1 The earliest appearance of Germanic peoples (see Warmington (1970:132-133, n2, 4))

- ca. 500 BCE: first Germanic inroads into south Holland, east Belgium and to the foot of the Ardennes
- ca. 250 BCE: invasion of the *Tungri* (settled near Tongeren in Belgium) into northern Gaul
- ca. 120-102 BCE: Cimbri, Teutoni and Ambrones
- ca. 100 BCE: Suebi (and related tribes like the Marcomani), Vangiones (Worms), Triboci (Brumat, Strasbourg), Nemetes (Speyer)
- 71-58 BCE: arrival of the followers of Ariovistus (king of the Suebi)
- 55 BCE: Usipetes and Tencteri

3.2 A summary of opinions in the French historical linguistic literature

(Bruneau (1969:24-27), Cohen 1967, Caput 1972)

- Germanic tribes (mainly Franks but also Allemanns) begin to settle in Roman territory (in Gaul) towards the end of the 2nd c. CE; Cohen dates this to the beginning of the 3rd c. CE; Caput 1972:14: the Allemanns settle in Alsace in the 5th c.
- it is likely that these peoples learnt Latin to some extent, and Germanic words make their first appearance in (ordinary) Latin (*blank*)
- 340 CE: founding of the Salian Frankish kingdom in modern Flanders, then Northern Gaul (Cohen 67:66)
- 406-407 CE: great invasion of Germanic (and other) tribes: Gallo-Roman populations in areas conquered by the Allemanns were wiped away, but those under Frankish rule were preserved
- by 700 CE: process of fusion between the old and new inhabitants came to an end; Frankish came to be regarded as important in the local "administration" (for centuries the "French" aristocracy was bilingual); the Gallo-Roman aristocracy also took on Germanic names (Cohen 1967:69); the newly emerging abbeys and the lower clergy attracted people (mainly men) of both Gallo-Roman and Germanic backgrounds (Cohen 1967:68).
- Hugo Capet (946-996) was the first Frankish/French king who attestedly did not speak the Germanic language

4 The proposal

- Dutch is the continuation of a Germanic variety (or varieties), notably of Old West Low Frankonian, that had lost aspiration in its stop subsystem under the influence of Latin
- the [sg] fricative subsystem survives intact to this day
- French is too late to have influenced Dutch

5 The borrowings

5.1 Borrowings into Latin preceding any kind of Germanic literacy

- Warmington (1970: 145, n7):
“There is no certain evidence that Germans could write in Tacitus’ time.”

J. Caesar (100-44 BCE), *De Bello Gallico*:

alcēs ‘elk; NOM. PL.’

6.27: *Sunt item, quae appellantur alces*. There are also what are called *alces*.

Pliny the Elder (23-79 CE), *Naturalis Historia* (10, 54): *ganta* ‘goose’

Tacitus (56-17 CE), *Germania* (98 CE):

Alcis ‘gods [DAT. PL]; cf. Gothic *alhs* and OE *ealh* ‘temple, sanctuary’ (Warmington 1970:203, N3);

43.4: *Ea vis numini nomen alcis*. This is the power of the divinities, of the name *alcis*

glesum ‘amber’ (cf. English *glass*)

45.4: ...*sucinum quod ipsi glesum vocant*. ...the resin which they themselves call *glesum*. (Amber was known to the Greeks as *ηλεκτρον* (*electron*) since the 4th c. BCE)

-burgium ‘town, -bury’ (3.3)

framea ‘spear’ (maybe related to OE *fram*, *freom*, *from* ‘vigorous, active, bold’ and *fremman* ‘to do, achieve, support’ Gm *fromm* ‘pious’; Lehnert 1969:84)

6.1 *hastas vel ipsorum vocabulo frameas gerunt*... They carry spears, or in their language, *frameas*.

other work (?): *medus* ‘mead’

All etymologies, apart from alcis in Tacitus, are confirmed by André (2001) to be of Germanic origin in Latin

Observations:

- these could only be borrowed with voiced <b d g> into Latin from a language where these consonants were voiced
- Latin was aware of aspiration: numerous Greek words were taken over with <φ θ χ>, that is <ph th ch> in Latin spelling);

5.2 Germanic words in French (and other Romance varieties)

based on Brunot (1966)

*band-	> <i>bande</i>	‘band’
*bank-	> <i>banc</i>	‘bench’
*blaw-	> <i>bleu</i>	‘blue’
*furbjan	> <i>fourbir</i>	‘to polish’
*pokka-	> <i>poche</i>	‘pocket’
*dulja	> <i>douille</i>	‘sheath’
*titta	> <i>tétine</i>	‘udder’, téton ‘tit’
*urdel	> <i>ordalie/ordel</i>	‘ordeal’
*giga-	> OFr <i>gigue</i>	‘type of violin’ > <i>gigot</i> ‘thigh of mutton’
*gibb-	> <i>gibet</i>	‘gibbet, gallows’
*graban	> <i>graver</i>	‘to etch’
*gris	> <i>gris</i>	‘gray’
*urgoli	> <i>orgueil</i>	‘pride’
*kausjan	> <i>choisir</i>	‘to choose’
*klinka-	> <i>clenche</i>	‘small metal bar in a lock’
*kruka-	> <i>cruche</i>	‘jug, jar’

5.3 Comparison with later, medieval Central-European Latin data

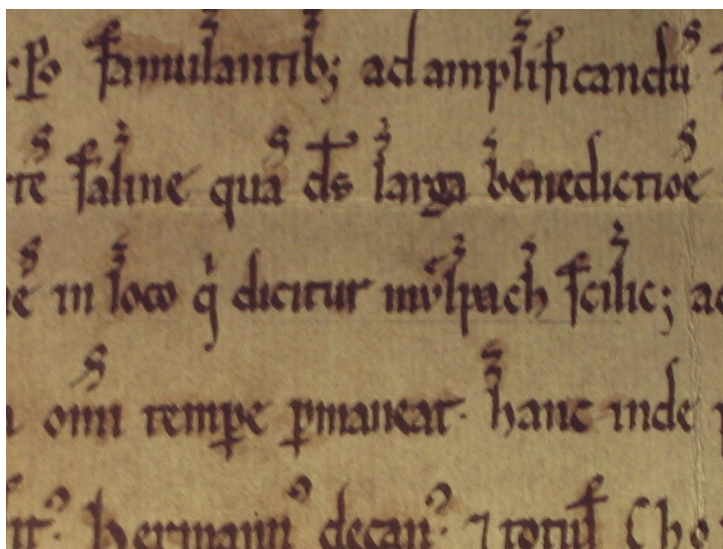
<burg> ‘town’

Mosapurg = Mosaburg “Zalavár (in Hungary)”

<bach> ‘streamlet’

muelpach = Mülbach

foundation charter of the Nonnberg (Salzburg) nunnery (1198; original kept in the Haus-, Hof- und Staatsarchiv, Vienna)



IV. CONCLUSIONS

- Dutch is a mixed system, which cannot be represented in a constrained theory like GP (as opposed to Classical Generative Phonology or OT)
- indeed, GP predicts that such systems cannot exist
- Dutch is an example of improper language contact, but the system as a whole is still learnable because its subsystems are natural
- we have pointed out that
 - a) only RVA makes Dutch a [voice] system
 - b) the fricative system is based on [sg]
 - c) the past tense allomorphy is also based on [sg]
- properties b) and c) could not be borrowed from neighbouring [sg] systems in want of evidence to the contrary
- the stop system, the [voice] subsystem, could be borrowed from Latin since [b d] allophones do appear in [sg] systems intervocalically

future research:

- to find evidence for the argument that [sg] languages *can* lack phonetic aspiration

REFERENCES

- Adamik, Béla. 2009. A latin nyelv története. Az indoeurópai alapnyelvtől a klasszikus latinig. [History of the Latin language. From Indo-European to Classical Latin.] Augmentum Kiadó, Budapest.
- André, Jacques [Alfred Ernout & Alfred Meillet]. 2001. Dictionnaire étymologique de la langue latine. Histoire des mots. [Etym. Dict. Of the Latin language. History of words.] Klincksieck, Paris.
- Backley, P. & T. Takahashi. 1998. Element activation. In E. Cyran (ed.) Structure and interpretation. Studies in phonology. Lublin: Folium: 13-40.
- Beekes, Robert S P. 1995. *Comparative Indo-European Linguistics. An Introduction*. John Benjamins Publishing Company, Amsterdam/Philadelphia.
- Booij, Geert. 1995. The Phonology of Dutch. Clarendon Press, Oxford.
- Bremmer, Rolf H., Jr. 2009. An Introduction to Old Frisian. History, Grammar, Reader, Glossary. John Benjamins, Amsterdam/Philadelphia.
- Bruneau, Charles. 1969. Petite histoire de la langue française. Tome premier. Des origines à la Révolution. (5th ed. revised by Monique Parent and Gérard Moignet). Librairie Armand Collin, Paris
- Brunot, Ferdinand. 1966 (5th ed., Preface by Gérald Antoine). Histoire de la langue française. Des origines a nos jours. Tome 1 De l'époque latine à la Renaissance. Librairie Armand Collin, Paris.
- Caput, Jean-Pol. 1972. La langue française. Histoire d'une institution. Tome 1 842-1715. Librairie Larousse, Paris
- Cohen Marcel. 1967. Histoire d'une langue : le français (des lointaines origines à nos jours). (3rd ed.) Éditions Sociales, Paris.
- Fortson, B. W. 2010 (2nd ed.). Indo-European Language and Culture. An Introduction. Oxford
- Helgason, P. & C. Ringen. 2008. Voicing and aspiration in Swedish stops. *Journal of Phonetics* 36.4: 607-628.
- Honeybone, P. 2001/2002. Germanic Obstruent Lenition; Some Mutual Implications of Theoretical and Historical Phonology. PhD, University of Newcastle. Submitted and examined (2001), graduated (2002).
- Honeybone, Patrick. 2005. Diachronic evidence in segmental phonology: the case of obstruent laryngeal specifications. In van Oostendorp, M. & van de Weijer, J. (eds) *The Internal Organization of Phonological Segments*. Berlin: Mouton de Gruyter. 319-354.
- Iverson, G. K. & J. C. Salmons. 1995. Aspiration and laryngeal representation in Germanic. *Phonology* 12: 369-396.
- Iverson, G. K. & J. C. Salmons. 2003a. Laryngeal enhancement in early Germanic. *Phonology* 20: 43-74.
- Iverson, G. K. & J. C. Salmons. 2003b. Legacy specification in the laryngeal phonology of Dutch. *Journal of Germanic Linguistics* 15:1. 1-26.
- Iverson, G. K. & J. C. Salmons, 2008. Germanic Aspiration: Phonetic Enhancement and Language Contact. *Sprachwissenschaft* 33: 257-278.
- Kaye, J., J. Lowenstamm & J.-R. Vergnaud. 1985. The internal structure of phonological representations: a theory of charm and government. *Phonology Yearbook* 2: 305-28.
- Lehnert, Martin. 1969. Poetry and Prose of the Anglo-Saxons. Vol. II. Glossary. VEB Max Niemeyer Verlag, Halle (Saale).
- Warmington, E. H. (revised by) & M. Hutton (translated by). 1970. *Tacitus I. Agricola, Germania, Dialogus*. The LOEB Classical Library, Harvard University Press, Cambridge, Mass. London, UK.